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Downtime

by Chad

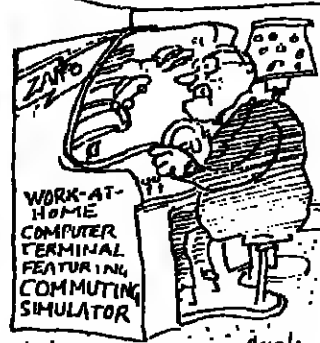
Drawing a veil over technology

MY colleagues at Sibob were puzzled at the opening address given by Mme Simone Veil, president of the European Parliament. In place of all the usual gushing and Motherhood, Mme Veil took the opportunity to jolt everybody by bluntness and grinding axes. Unfortunately, she seemed to have got her script from the Guardian women's page.

Talking about office systems, she admitted that these were used mainly by women but were chosen by men.

Oh, thought I, as I run through my mind all the best-known pundits in this field: Nuala Buckley, Doris Lenson, Shirley Pickard, Emma Bird...

Then she asserted: "If the majority of interactions between people are conducted via machines, and machines with memories, we could end up with



Now automation takes over the spelling . . . or does it?

I LONG ago gave up trying to keep track of how many word processors there are on the market. It must be up to about 2,361 by now.

What is distressing is that it is becoming harder and harder to tell them apart, as the "What's new, Copsey?" syndrome takes over and all the suppliers end up with identical all-singing and dancing products.

You used to be able to spot the IBM machines because they were small and peculiar, and Xerox had a menagerie of control devices called mice and cats and things. Now even IBM has brought out a 'normal'.

If you come across any infallible systems, please let us at CW know, will you Madam?

Mme Veil exhibits the increasingly common mixtures of an intolerable impoverishment of personal relations.

I spent some time trying to imagine what on earth she had in mind here. Then I thought: "Shame on you, Mme Veil! Don't you read Downtime? How about the American couple I wrote about last year who met each other and got engaged over a distance of 2,000 miles via terminal?"

What bugs me now is the latest trend: hell/whistle that everyone is rushing to add to their kit, namely the automatic spelling corrector, laughably so-called. It looks through your text to see which words are not in its dictionary of the English language, and

flags those that aren't on the assumption that they are mistakes. You then have to correct them, or assure the machine that you were quoting some Patagonian and that it was OK.

This is all fine and dandy, except that it fails to spot all those errors where another valid English word is produced. Thus it finds the unimportant mistakes and misses all the important if not libellous ones, such as where "saw" comes out as "nut", or "detective" as "defective", or "friend" as "fiend". So you have to go through and check every word anyway, and the fact that some of the mistakes have been removed already simply increases the monotony of the operation.

It also encourages you not to bother to check yourself, which will (not might) be disastrous.

That's my theory, anyhow. As you can imagine it receives little sympathy from the Apostles of Technology Gnome Mad. My distinguished colleague Peter Laurie, editor of Practical Computing, whose faith in science I have had little success in awaking, has

even devised a spelling corrector, which changes invalid words into valid ones on the assumption that a standard error such as transposition has been made.

When I tell him I think his prized invention is a Bad Thing, he looks at me like one of the people who said human beings would fall apart if they travelled at 40mph in trains.

And so it goes on. I hear one manufacturer talking of having not only a corrector for spelling, but one for punctuation and grammar as well. Banish untested particles forever! How are they going to do this? Ah, science will find a way!

Wonderful! Then they can provide what we really need, and that is a corrector for muddled thinking. It wouldn't be too popular with politicians, though.

There is a rumour around our office that the management of this newspaper is thinking of bringing in one of these devices to improve on my jokes. It may surprise some of you to learn that this column is not written by a machine already.

Amdahl software products growth

THE announcement last week by Amdahl of its own version of the Bell Laboratories Unix operating system marks a substantial step in the process which is turning Amdahl Corp from a straight IBM compatible mainframe supplier into a fully fledged computer company.

Amdahl calls its version of Unix the Universal Timesharing System, and it runs under the VM/370 operating system on its 470V series mainframes.

An Amdahl spokesman in Sunnyvale explained that the company had decided to offer UTS because it is popular with universities, with computer science graduates and because IBM has nothing to match Unix in its software portfolio.

"You have to choose between TSO, which is powerful, and CMS, the Conversational Monitor System which runs under VM/370 and is easy to use. With UTS you get a powerful time sharing system which is also extremely user-oriented." Languages available are all those supported under VM.

In the US, a UTS licence costs \$3,000 per processor per month. "You also need a Unix licence from Bell Labs, but if that costs anything it is only nominal," commented the spokesman.

Amdahl did the adaptation of Unix version 7 and has been using it in-house for some time. Requests for it from users led to the company offering it as a product.

Its most availability on large mainframes makes it accessible to big shops which want to support 20 or so users simultaneously.

First user outside Amdahl is likely to be Bell Labs itself. AT&T and its subsidiaries like Bell are Amdahl's biggest customers.

single console. MSCC runs on both processors and was originally developed by Amdahl for its own in-house use. Support for three or four processors with MSCC is planned.

Reason for doubling the channel count to a maximum of 32 is that the big 470s are powerful enough to handle the many and several large transaction processing users and big airlines are running out of channel capacity. The IBM 3033 maximum is 16 channels.

Viewdata show debut

TELEPHONE answering machine supplier Ansafone has diversified into the viewdata market and the subsidiary formed for the purpose, Viewdata Business Systems, plans to show the Pye Visa 12-inch monochrome terminal as its first product at the Viewdata Exhibition at the West Centre Hotel in London from October 29 to 31.

Available

Initially Amdahl will offer UTS only to its own customers, but later on it is likely to be available to any IBM or compatible user.

The Amdahl announcement also included the Multiple System Communication and Control software which allows two processors to be run loosely coupled from a

Computer Departments, who then defined their ideal printer according to eight criteria.

These were noise, print speed, legibility of the seventh copy, and compatibility with the British Airways' extensive communication network, variable speed—they needed from 1200 baud in Africa to 9600 in America—quality of engineering, ease of maintenance and reliability.

They then scored eight of the world's best known printers out of ten on each of those criteria, subjecting them to the kind of treatment the Consumers Association usually gives washing machines.

THE SOLUTION

The Texas Instruments Omni 810 won convincingly.

Which was particularly pleasing since it was

any system's oldest competitor. The delightfully unsophisticated ballpoint pen.

And after conducting a thorough evaluation, the printing system they chose was the Texas Instruments Omni 810.

THE PROBLEM

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All of which help keep the solution to any of your problems well within our range.

Each side blames the other for the two shows clashing. Copsey-Smith said that the dates for Info 81 were announced 12 days after the Imec dates were made known in a letter to exhibitors on January 30 this year. But Alan Gash, boss of BED, said that the dates of Info 81 were also printed on the back of the Info 80 show guide in the middle of January.

Gash added that the dates of all the Info shows for the next four years were listed in a statement of policy letter put out by BED in March. He remarked: "No one can say we are fooling around with dates. Info will be held in the same week of February every year."

Prime graduates

PRIME Computer introduced its graduate training scheme earlier this month when 11 such students started an 18-month course at its Southampton training centre.

Most graduates have science and engineering degrees and they will share their time between the lecture room and working on pre- and post-sales and systems analysis at Prime offices throughout the country.

Prime plans to employ the graduates at the end of the course.

More exhibit at Info 81

ACCORDING to BED Exhibitors, the organisers of Info 81, the number of firms booking space at the show has increased from 85 to 71 following the decision by Clapp and Pollak to kill Imec 81.

But Clapp and Pollak say that some firms which were intending to exhibit at Imec 81, including NCR, have now decided to add their names to the list of



The new Philips P2000 microcomputer, built around the Zilog 280 chip and aimed at the professional market, comes out of the company's Austrian subsidiary in Vienna.

Pictured here at Sibob, the P2000 consists of the basic keyboard unit, which includes two slots for program ROMs, and a microcassette drive. The screen plus floppy disc unit is a separate option with a stand which allows it to be placed over the basic unit. The only language is Basic.

At Sibob, Philips was promoting its use with a ROM programmed for word processing, for which a delay wheel printer is offered.

It comes in a 40-pin package and has 16 on-chip and 256 external registers, and 64 input-output ports.

Laungages supported include Fortran IV, RPL 2, Basic, APL and an assembler. Philips in West Germany, responsible for the company's small business computers, is studying the Fast-2 version for possible use in future business systems. Volume deliveries should start within two years.

A board computer version of the Fast 1 called SBC is already available for technical applications and Philips is using it in its own plants.

● "Fast" stands for Foutenay, aux-Roses where the chip was designed. Appleton, where the layout for the masks was done, Sunnyvale where Signetics is making it and T for Technology.

PHILIPS in France has announced an electronic mail system for the banking market based on the PTS 6000 series of banking terminals and computers.

Called Office 85, it was originally developed on behalf of the Swedish PTT. The vital elements are Philips P 5002 word processor and the controller mini in the PTS 6000, which comes from Philips' P800 series.

The mini needs disc backing so that messages can be stored and retrieved, sent on to other PTS 6000 systems or a central mainframe, or transmitted over the telex network.

Office 85 is a small step towards Philips' global aim of offering integrated systems embracing transmission and processing of text, pictorial information and speech, and will apply new technologies that it is researching, such as video discs.

Clash

Imec 81 was to have been held at the Wembley Conference Centre from February 10/13, exactly the same dates as Info 81 which is going ahead as planned at the Curran and Gloucester Hotels.

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Segment memory for Fast-2

HAVING introduced its Fast-1 16-bit microprocessor earlier this year (CW, July 3) Philips is working on a faster version with extended addressing. The Fast-2 will use segmented memory techniques to address 3 megawords of main memory and will cycle at 230 nanoseconds compared with 32K-words and 385 nanoseconds for the Fast-1.

The chip is a microprocessor version of the Philips P800 series microcomputer and is therefore backed with a wealth of mature software.

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FOCUS

Ignore these happenings at your peril

SICOB and the Computer Users' Year Book have a lot in common. Both arrive on the DP scene at the natural start of the computing year and both deal with massed data and are packed with information.

This year, Sibob, the French International computing exhibition, overflowed on to adjoining rooftops, and the CUYB has overflowed to coloured indexing.

Given the growth since, next year could well see Sibob splitting into separate office furnishings and computing exhibitions, while the CUYB splits into two volumes or possibly publishes on microfiche.

In any event, ignoring either happening would probably label the DP man as "yesterday's man" or at least "last year's". The main theme of both events is the telecommunication explosion. Just about every stand at Sibob demonstrated the ease of transmitting data, voice and facsimile traffic across wide spaces. It is now feasible to bounce data off convenient satellites and have the reply back almost before the transmitter is released. But communication routes to the more local "Crazy Horse Saloon" was rather more difficult, the telephone lines seemingly being permanently jammed.

Snags

Whether it is a matter of finding the way round Sibob or the CUYB, many snags line the route. Unexpected bottlenecks occur at every section, and unless there is total dedication to the task in hand, it is all too easy to get sidetracked on the latest range of Grundig electronic TV video systems or the number of Philips computer installations in Gloucestershire, using Ada programming.

Most interest at Sibob was on the much anticipated Burroughs B5900 range. The new system is billed as the last conversion and the smallest large machine on the

market. Whether users will appreciate the total IBM independence in software remains to be seen.

Q1, the National Enterprise Board-supported microcomputer company showed UK enterprise in presenting the new work-desk Winchester disc system 100; as did ICL who made a welcome return to Sibob after a break of three years.

Puzzling

For the UK visitor, Sibob is puzzling. Everything seems to be up and running on day one and there is a noticeable lack of builders, painters and system engineers. Refreshment facilities are more than adequate although wine appears more readily available than lager. Information services were in evidence, but all routes tended to lead back to the elevated Honeywell Bull display or the ever hectic IBM stand.

This structured path approach is not reflected in the CUYB. However hard one tries, the required section seldom comes to hand. Data retrieval operations almost invariably have to be channelled through the index—or even through the index of indexes.

Most user-traffic by tradition concentrates on the salary section and this, possibly deliberately, comes early in the volume. The analysis this year is fully comprehensive, covering 21 job categories, listed by both installation size and location.

Once again, DP managers come out poorly in annual salary increases. Programmers had an average pay increase during the year of 26 per cent compared to the more modest 18 per cent for the DPM.

Not surprisingly the book reports an increase in the number of training schools. No doubt they are kept busy with a rush of DPMs seeking to be converted to programmers.

Meanwhile, the CUYB has introduced a new order of DP merit—the "first-time CUYB reader." This category certainly sorts out the DP men from the boys. Future BCS qualifications could well include a minimum of three years' CUYB experience.

"The British Airways computer print-out system is as easy to handle as its oldest competitor."



John North, British Airways Project Manager for Ticketing and Sales Accounting was one of the people faced with the problem of finding a ticket printout system that was as easy to handle as

any system's oldest competitor. The delightfully unsophisticated ballpoint pen.

And after conducting a thorough evaluation, the printing system they chose was the Texas Instruments Omni 810.

THE PROBLEM

Over-complicated printers all too easily break down and leave the poor sales clerk trying to produce seven legible ticket copies by hand. Which is not just inconvenient but also a waste of valuable time. So, when British Airways needed to order 150 printers for their sales offices all round the world, they kept their sales staff very much in mind.

Firstly they gathered experts from Engineering, Maintenance, Commercial Users and their top

Qualities like that together

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In many cases they can be done quickly by the clerk himself.

And it's also made up of large sub-assemblies for ease of repair and maintenance.

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OMNI 800
a registered trademark of Texas Instruments

PAGE SIX

for programmers
and analysts

by Pamela Rowe

Difficulties of trying to gain entry into this 'understaffed' profession

THE other day I received a phone call from an operator working in London, asking how I broke into programming. He has been trying for 14 months. His original idea was to get there via Ops. To date he has answered 25 advertisements for trainee programmers, applied for retraining with his company and taken two evening courses — one in Cobol involving one evening a week for a year, and another to gain the City & Guilds certificate in Data Processing, which took a gruelling three evenings per week for a year.

He also estimates he has written some 10 Cobol programs "helping out" while employed as an operator for the Army & Navy Stores. He has taught himself Assembler and PL/I, though not used them in anger. Results? Well, he did get an aptitude test from his employer but failed to get the job at 10 points below the top scorer. From the others he has not had a single interview.

"It's terrible now," he said. "For one operations job I went for, there were 250 applicants for three vacancies."

The only avenue he has not tried yet is a TOPS course, partly because of the worrying doubt about the prospects at the end of the course, but mainly because of financial commitments. Now he has to reconsider whether he can afford it after all. "I've got to make sure the mortgage and other bills are covered, but I'm getting a bit desperate now. I feel as though I'll go on like this for ever."

Leaving aside his aptitude, which is an unknown quantity, his story does underline the difficulties involved in entering programming — a profession which suffers from a serious shortfall of 500 programmers in London alone, states a recent report.

I have received many letters, with similar views or from the other side of the fence. I've picked out the bones of some of these to present a whole picture...

...sions were that replenishment of staff losses should be by recruitment of trainees and that TOPS courses are a potentially valuable source, and secondly that stronger links are needed between commerce, industry and educational establishments.

As an employer I have replaced the six, out of 71, experienced people whom I have lost this year, by trainees.

I know that as a result of the economic recession the employment situation is now easier for employers than it has been for some time. However, we must be ready for the upturn when it comes — and this means taking trainees now. It is, I believe, in our own best interests to avoid future shortages for experienced staff by ensuring that we all contribute towards an increase in the total number of such staff.

The TOPS training managers that I know do make considerable efforts to place trainees, and in most cases these efforts are rewarded by very high placement levels. (I am, for example, extremely surprised by the statement in Mrs Smith's letter that 50% of CDI graduates are unemployed.) Where, I think, in some cases there may be room for improvement, is in the amount of contact between users and trainers.

Whenever a training institute contacts you for consultation on course content, computer type availability, or types of languages, I would suggest that you would find a long-term benefit in responding fully.

DOUGLAS BROWN
Executive DP manager
Kalamazoo Computer Services

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Employers lack interest

APPROXIMATELY one year ago I discovered my temporary contract with Bradford Immigrant Services would not be renewed. I had been teaching English as a second language for a year when I finally became unemployed.

After getting absolutely nowhere in gaining employment in teaching, I began to look at the possibilities of a new career in computing.

First I thought of a TOPS course, but did not pass the aptitude test. So not having a degree — I have a Cert. Ed. — I applied to Huddersfield Polytechnic. After an interview I was given an unconditional place to study for a BA in Computing and Business Studies. I began on September 22, but my problems also began.

Having already had one grant I have, after appealing, not been able to obtain a penny piece from the local Education Authority.

Fortunately, I can just about pay my fees and expenses in the first year, but I will have to rely on industrial sponsorship if I am to complete my degree.

Here is the real problem: Despite the apparent shortage of well-trained and qualified staff, my approaches to the computer industry have met with a complete lack of interest.

The training of the degree course is thorough, involves one year in an industrial context, in-

cludes sections on accountancy, economics, sociology, and teaches programming in three languages: Cobol, Algol, and PL/I. It is extremely cost effective, yet apparently arouses no interest from companies for sponsorship as an alternative to expensive manufacturers' courses.

D. TELFER
Bradford

I sent a copy of this letter to Bradford Local Education Authority, and invited their reply. Their spokesman said:

I WOULD confirm that the council policy is that where students have already received assistance for one course they will not normally be considered for an award for any further course, until they have completed an equivalent period at their own expense.

Where a student feels he has a special case he may appeal and this is considered by an appeals committee. Mr Telfer did appeal but the committee did not feel his circumstances were such as to warrant an exception being made to the general policy.

Applications for further training are not normally considered unless they form a natural progression to past studies.

However, to do this two conditions need to be satisfied. Firstly the selection criteria must be sufficiently strict as to include only students who are capable both technically and emotionally of completing a demanding and difficult course.

Secondly the training must be designed not to punish the students as full of computer knowledge as possible, but to give them sufficient knowledge of a number of computer techniques, to make them a worthwhile proposition.

All in all, I feel that training companies should be more aware of the changing requirements of the computer industry and ensure that their courses react to this change. I also feel that more emphasis should be placed on the preparation of students to take up employment.

MARK PLANT
Marketing manager
McDowell, Knaggs and Associates
Worcester

Puzzler

There is only one solution to the equation $x^2 + y^2 = z^2$, given the fact that all three integers involved are different. Can you find it before turning to page 457?

Several readers have written or phoned to point out that Dudeney's "angle-switch" equation $AB \times CD = BACD$ (Puzzler, July 31), supposed by him to have only one single answer $4139 \times 1436 = 59361436$ is also solved by $2140 \times 1260 = 2696400$ and $1830 \times 8680 = 15881400$.

Admittedly, this great 19th-century mathematician was working without the aid of a computer. Nevertheless, it is indeed surprising that the "cook" has remained undiscovered till the present day.

...business systems as a background to analysis. To a large extent this is time wasted if employers are looking not for analysts but for competent programmers.

Also, I think that the "profile" system used by the training schools to represent their students is inadequate. It is superficial and tends to give a misleading impression. It would be interesting to hear comments from DP managers who have been faced by a pile of these profiles when looking for a junior or trainee programmer.

ALAN PEMBLETON
Leeds

Criteria must be strict

MY personal experience includes the recruitment and selection of TOPS students and the subsequent placement of the more successful. This varied between 70% and 80% of the total students on a particular course. In my opinion it would be quite possible, even in today's economic climate, to achieve a significantly higher figure.

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SOFTWARE FILE

by Claire Gooding

Empire strikes back at market

ONE of the pioneers of the software products field, Applied Data Research, is keeping up with the times. Its latest system, Empire, is a sign of how the emphasis has changed from measuring machine performance to managing resources.

Empire is a financial modelling system for IBM and other mainframes and large minis. It is aimed at a growing market, which caters for the increasing need to combine present facts with future possibilities to keep a user's growth on an even keel.

Likely needs

The idea of a financial model is that using facts from past years one can build up an idea of what might happen in the future. Using complicated statistical formulae in a macro form a user can predict the company's likely needs in such areas as raw materials, manpower and cash flow.

Having worked out one's model, ADR's system allows the user to play around with potential changes — the "what if?" option.

First the various elements and their relationship to one another is established in a matrix. The user can then use standard functions such as depreciation and risk analysis to make forecasts.

The what-if option is useful when the manager wants to see how changes would affect his forecasts. It allows him to take such imponderables as an increase in



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VAT or devaluation of the pound into his profit-forecast, or adjust his raw-materials order according to availability.

Rather than presenting the information in rows of figures, ADR has made use of a Tektronix 4027 colour terminal which employs graphics and colour to give the results an easily-understood format.

Empire already has 450 users in the US, where ADR launched it 18 months ago. It is available in the UK for £18,500.

Financial modelling has become a boom market for software applications. ADR's Nicholas Pollard, managing director of the firm's recently set-up UK branch, believes that Empire has an edge in the market by virtue of its novelty. "It is a recently designed system and advanced facilities have been integrated in its design rather than added on," he said.

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LATEST move from Perkin-Elmer in providing software for its 32-bit "super mini" computers is a Pascal compiler. The compiler is for Model 3220s and 32240s, allowing up to 64 users, and conforms to Ansi draft standards.

It extends the options available to the user with support for modular program development, separate compilation of procedures and external library routines in Pascal and other languages.

The price, including documentation, is £3,620 with right of copy to £360.

New tool for PE

A PERFORMANCE enhancement tool which is said to double throughput and halve response times for Perkin-Elmer 7/32s and 3220s has been released by Tri-point Associated Systems Consultants at Sunderland. Called Intercom-T, it supports up to 60 terminals under OS/32MT.

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Compower's APL relational database

LATEST addition to the rapidly growing range of business systems using the high level language APL is relational database. Called Piramid, it comes from the Stoke-on-Trent APL bureau Compower and uses the company's Powershare network.

Although it is aimed at helping non-APL users, making use of English-language commands and guidance, the database is also likely to be an aid to APL programmers who are used to dealing with arrays and two-dimensional tables.

"The linkage between files can be made on one field," explained Alan Gregory of Compower. "And any key can be a concatenation of elements. Theoretically, there is no limit on the number of files we can join. It all depends on the amount of disc space the user is prepared to take up."

"We have actually linked 24 files together on one application for partial text retrieval," he continued. "In another, for personnel

files, everything is coded in separate tables and retrieved as a joined code."

The system is designed to be informal. Once the datasets and their relationships have been set up, the user only has to specify data name and search criteria to get an answer. Security clearance is automatically checked before access is allowed.

Compower claims that clients can benefit from the service without APL knowledge; experienced APL users can extend Piramid functions to suit their own purposes.

It is already being used for order processing in an engineering firm, a property register in an investment firm, and by Compower itself to monitor network performance.

Compower is a wholly-owned subsidiary of the National Coal Board and offers a library and bureau APL service including the teach-yourself APL course, Staple,

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MICRO NEWS

NatSemi's 16-bit 1600 chip is late but 'will be better'

SAMPLES of National Semiconductor's proprietary 8-bit single chip CPU, the NSC800, have been available this summer, says technical director Pierre Lamond. "The date for volume production depends very much on the application, but basically this will be in three to four months," he said, so we can expect them in early '81. "The 800 chip uses a 280 compatible instruction set which comprises 158 instructions and has a bus structure similar to that of the Intel 8085. It is built using National's low power NMOS or PMOS technology at dimensions of 3.5 microns. Three layers of polysilicon, instead of the more usual two, means another mask in the production process and thus a reduced yield.

Although other technologies run at the 2.5 micron range, NMOS suffers no increase in die size. National claims a reduced die size which can be coupled with the primary advantage that NMOS has over PMOS — low power.

Applications

It follows that the 800's main applications are in the low power area, such as portable instrumentation, equipment and remote operation.

"Low power applications always carry a premium over NMOS technology in that total system costs go down about 25%. Low power means a small power supply and

little heat dissipation requiring no fans," he said.

In the 16000 program, National intends to introduce the main CPU, the 16032, in spring '81, followed by peripherals at two-monthly intervals. "By April 1981 we should have seen five or six major products — the core of the family — and many more will follow," Lamond added.

Technology

The 16032, also built with NMOS technology, is due to be sampled in October. At three micron dimensions the device will have less than one nanosecond of on-chip gate delay. Following this will be the 16082 memory management unit, the 16202 interrupt controller unit and the 16081 floating point unit.

Based on the slave concept the 16000 family will eventually comprise a selection of CPUs supported by a set of peripherals and slave processors to provide, interrupt, management and high speed floating point facilities.

Other planned members of the family at present are two more CPUs, the 16016 and the 16008; and three more system control elements, the 16201 clock generator, the 16203 data memory access controller and the 16204 bus arbiter.

Does this mean that National is lagging behind the rest of the single chip 16-bit microprocessor

developers? Intel has been shipping 8085s for some time; Motorola and Zilog have been shipping 68000s and Z8000s for at least nine months.

"We are behind chronologically — but not from the point of view of performance," said Lamond. "The 16000 belongs to the 1981 generation. We will continue adding components and features and eventually put the main processor with its slaves on to one chip," he said.

"Although the 16000 is a 16-bit chip, it has a 32-bit internal architecture and we have tried to design it to expand upwards. We will be modifying it into a 32-bit chip, but at the moment that is not essential. It is important, but other areas are more important," he continued.

Lamond admitted that National is under a fair amount of customer pressure to introduce a 32-bit chip because of a need for larger memory addressing ability. "People want large words to address 1 megabyte or more."

Performance

He stressed that, for most applications, the performance of existing 16-bit processors would suffice. "Many users are over-designing in applications that could be solved using lower bit processors," he said.

When it was pointed out that both Intel and Texas Instruments had already announced plans for



Since the UK announcement of National Semiconductor's proprietary 8- and 16-bit microprocessors last Christmas, little has been heard of them. On a visit to the US, Micro News editor Eileen Stainer talked to Pierre Lamond, vice-president and technical director, about the current status of these devices, the NSC 800 and the NS16000.

Discussions led to National's views and opinions of the next generation up: the 32-bit microsystem. Lamond described the company's plans in this area, comparing them to the pre-announced programs of Intel and Texas Instruments.

National Semiconductor's vice-president and technical director, Pierre Lamond, is draughted for the part in the production area at the headquarters in Santa Clara, California.

future 32-bit generations and that Intel expected to sample its first 32-bit CPU by the end of this year, Lamond responded: "We will have to have one in the 1983 time range."

How will National's approach to the 32-bit generation compare with Intel's and TI's approaches which are concerned primarily with the software problem and how to solve it?

Lamond agreed that the software cost problem is of prime importance and that National will be carrying out its policy of making things easier for the user in its solution to the problem.

"We plan to make our products

easier for the customer to use. At the manufacturing level we have software problems too so things will be easier for our own people if we develop software useful for our customers," said Lamond.

Approach

He stressed that National would not be following the modular firmware approach announced by TI, but would definitely be incorporating operating systems on to silicon in a similar way to Intel. This would be appearing with the 32-bit form of the 16000 some time in 1983.

It is currently working on

support and development software for the 16000, and an emulation system will be ready in about a month. Lamond considered this to be fundamentally more important at present.

Developing a 32-bit form of the 16000 by modifying the original die, and incorporating operating systems on silicon will involve a lot of work, according to Lamond.

"We have to have an upward path. Intel customers that are using the 8086 will find it very difficult to move up to the iAPX 432 and its family," said Lamond. He added: "We will probably start designing a true 32-bit processor from scratch next summer."

Chips shortage predicted for '81

A SHORTAGE of chips was predicted for mid-1981 by National Semiconductor president Charlie Sporek in an interview with Eileen Stainer.

Currently there was a surplus of chips, said Sporek, adding that although demand had fallen this year he expected it to rise again in spring 1981.

These views run closely with those expressed by the American Semiconductor Industry Association. It predicts an excess of supply over demand for the next six months, and a shortage of components is expected in the middle of next year.

Sporek went into it in more depth, adding: "I feel that the industry will be capacity-limited especially in leading edge MOS technologies." Last time the shortage was most noticeable in the 16K dynamic RAM market. He attributed it to the sheer assets of the semiconductor companies involved and the availability, or lack, of people.

Approach

How will National Semiconductor tackle the next few years, and have its plans been affected by the current situation in the industry? "Obviously not, as we have recently commissioned a plant in Texas the size of our Salt Lake facility and we have other expansions planned. We have not changed our projections for the next 10 years," said Sporek. He added that National is looking for another plant in the UK.

Why did National decide to concentrate on a range of proprietary devices, like the NS16000 family, when it was doing well in the second source business?

"The bulk of our products have always been proprietary. Our first 16-bit microprocessor, the PACE, was our own design. Admittedly, we do second source Intel's 8080 and 8048, but it is not a company strategy to second source only.

"If you look at our total operation, 75% of dollar volume is our own design. In microprocessors we follow a policy of proprietary products filling in with clear winners," he said.

Expensive

"The NS16000 program is an expensive one. We did it because we want to be a broadline supplier of semiconductors, and we have to commit resources to it for our customer base.

"This does not mean that decisions are forced on us by our customers. They supply the inputs and outputs as a guideline to the way we should go. If we restrict certain areas we become a lot less critical to our customers," he said.

What does National see as its major growth areas over the next few years? "We separate our business two ways, into markets and products. In the latter the big growth will be in logic chips, memories and microprocessors rather than in linear, hybrids or discrete devices. "The telecommunications market will be an enormous growth

area, but the general data processing market will not be far behind.

R&D priority

"The IBM plug-in market will continue to grow as it has been. It gives customers a real alternative; that is why we are backing it," replied Sporek.

National is also concentrating research and development in the speech synthesis and recognition markets. Expectations are that by 1985 the dollar sales market for speech synthesis chips will reach \$250 million.

High priority in R&D is being given to developing a real time speech synthesis technique. This follows the company's main strategy of high quality speech.



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High priority for speech synthesis

NATIONAL Semiconductor's speech synthesis research, which has a high priority, involves digitising a simplified version of the speech waveform, encoding it in the digital form and storing it in ROM. The type of digitising used, adaptive delta modulation, incorporates compression techniques to enable more data to be stored.

The first product available is a two chip set called the digitalizer which comprises a speech processor and the digitised words in ROM. Regeneration of speech is controlled by the processor: it accesses encoded data from the ROM, decodes it and demodulates it into a form suitable for a loudspeaker.

Sex

About 30 words can be stored in 4K-bytes of ROM. The exact figure depends on the sex of the speaker: for a male the storage rate is 1,000 bits per word; for a female it is 1,500 bits per word, according

to National. The digitalizer comes with 2K-8K-bytes of ROM. A digitalizer with 50 words encoded costs \$12, but the price goes up to about \$20 when the necessary filters and amplifiers are added. Customers can commission National to encode extra words in personalised voices.

National's main policy is to produce high quality speech, according to Fred Wickersham, product marketing manager for main-ROMs and speech synthesis. The company believes that there are many applications like security, alarm systems and defence where only high quality speech is acceptable.

Its major competitor in the speech synthesis market, Texas Instruments, is concentrating on lower quality speech for home computers and similar applications using a linear predictive coding method.

During next year, National Semiconductor plans to bring out two more speech synthesis chips.

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OP SPOT

A site where ops are given a high status . . .

THE UK direct mailing operation of Reader's Digest is on a scale sufficient to give the Post Office industrial status. Every year over 50 million items are posted from a controlled list containing some 22 million names. The list must have nearly every household in the country on it, although the Digest's publicity department is coy when it comes to giving details.

Says Philip Wilson, computer operations manager at the Digest's Old Bailey installation, "It would be impossible to put a price on that list." He is in charge of the computer room and an offline printing department, and has responsibility for 39 people. Eleven of this number are directly involved in operating an IBM 3031 which runs day and night for seven days a week administering the Digest's promotional and billing activities.

Stability

For those anxious to see operating defined as a career, the good news is that the site is one where the operator is given a high status. The bad news, if anyone is thinking of applying for a job, is that staff turnover is so low that no one has been recruited into ops for over a year.

To some extent this stability is attributable to the incentive of a profit sharing scheme. It is also due to the fact that a career structure exists within the installation.

The average time an operator spends with the company is four years and the longest serving member of staff, shift supervisor Chris Green, has been there for 20 years.

INFORMATION PROCESSING SPECIALISTS

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ADDS VALUE

40. Use the 25 pin extra...
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Standard features on all models including:
- 25 pin extra...
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ADDS value means more reliability, more adaptability and a host of other...
- 25 pin extra...
- 20 pin with...
- 16 pin...
- 15 pin...
- 10 pin...

ADDS value means more reliability, more adaptability and a host of other...
- 25 pin extra...
- 20 pin with...
- 16 pin...
- 15 pin...
- 10 pin...

Says Bloomfield, "Their priorities are our priorities. We're involved in producing the same end product."

At Christmas there will be a change from the current 3-megabyte 3031 to a 4-megabyte IBM 3033 and with that will come a change to DOS/VSE2. The training for a previous change from EDOS to DOS/VSE1 was handled by Infotech. Wilson was so impressed with the course that he wrote Infotech a glowing letter - which glowed enough to be reprinted in Infotech handouts.

Progress

Prior to his work as a bus driver, he did a short stint as a salesman and spent seven years in an administrative job. He left that because he found no prospects for promotion.

"When I started here I was unsure if I could achieve anything as an operator," says Bloomfield, "but if you've got the ability you can progress in this company."

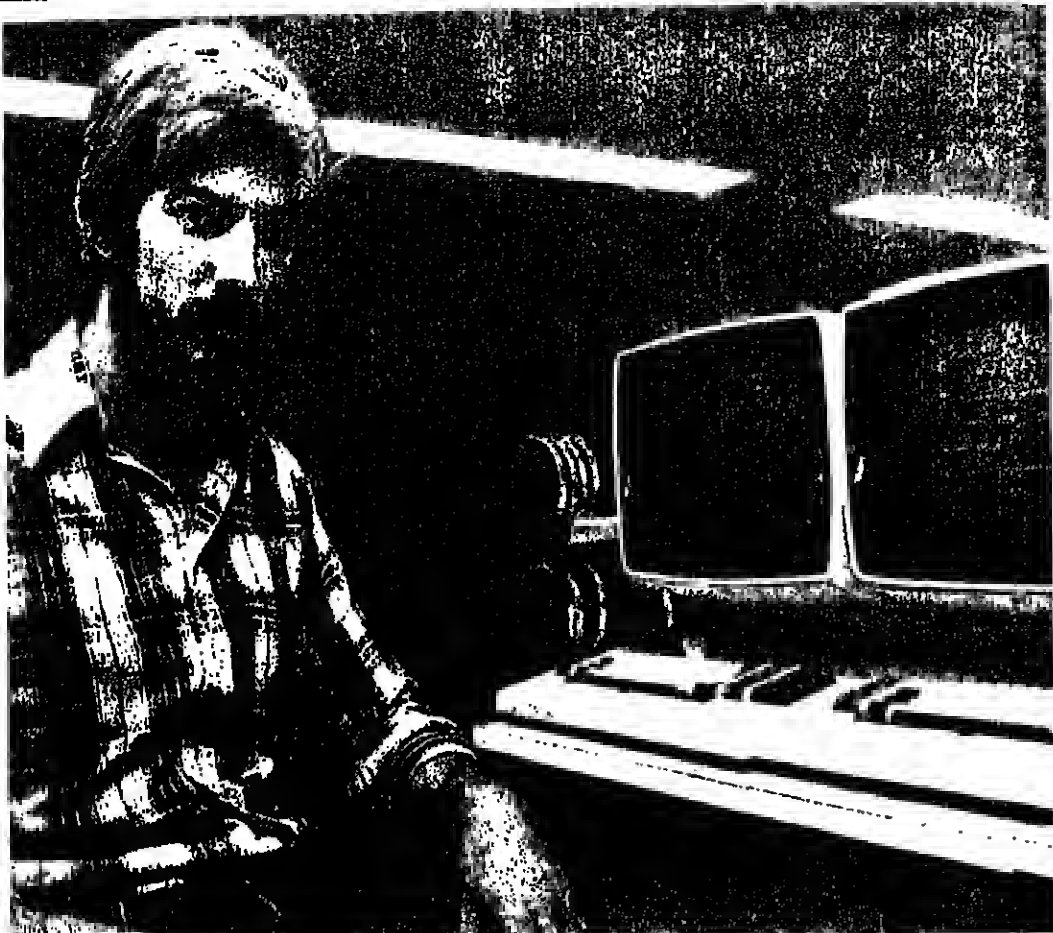
At this point Wilson clipped in, "It's in our own interests to let people progress."

"The operator," says Wilson, "should not be someone tucked away with a black box unknown to anyone else in the building. That's unforgivable." So he allows all members of the Reader's Digest staff ready access to the machine room, although this access is strictly controlled.

Programmers are not allowed to stroll in and out of the machine room and the operators handle most of the program testing work. Programmers and operators communicate by way of a hatch at the back of the computer room which can be opened only from the operators' side. It was told that no programmers had succeeded in climbing through the hatch.

Wilson seems to encourage a move in the opposite direction and says, "One of my ambitions is to get my ops trained to systems programmers."

An understanding of operations is demanded of the programmers who spend a day or two in the machine room as part of their induction course. The increased technicality of modern operating systems makes it a necessity for people to know what is happening in the computer, said Wilson.



Above: Bloomfield... "If you've got the ability you can progress in this company."



Right: Wilson... "It would be impossible to put a price on that list."

Switch

Apart from the increased machine power the 3033 will bring, there is to be a switch to Storage Technology discs, Wilson says.

"CPMs are that much more competitive with peripherals than IBM is at the moment, although it's a different story with the processors."

He obviously can't make any predictions about future price changes, but finds himself, like so many others, cast in the role of an IBM watcher.

Wilson would like to have customer inquiries online within the next two years, and ultimately wants main files to be held on fixed disc. At present the names and addresses of 8 million people who have made or are making a purchase are held on 42 reels of 6250 tape.

When a cold start is called for . . .

FEW VM sites regularly do a planned cold start IPL. In any case the users are rarely too badly caught out by an unplanned one, as they can fall back on their files in the event of a catastrophe.

Under the VM/370 operating system cold starts are done in a number of circumstances. They

are necessary following an initial load of a new version of the system itself, or if an unrecoverable error has occurred in reading output files or recording records.

Serious corruption of hardware logic or the control program also call for a cold start.

Colin O'Keefe, an operator with

British Airways, says, "If you are a VM/370 system operator and make use of the LOGMSG facility, your users would appreciate a message when the system is IPL'd. This should explain the problems it may have caused, and should also say when the cold start was necessitated."

Blast - the computer's blown up!

THE Bowater paper organisation seems prone to the odd explosion or two. On September 17 its electricity generator at the Kemsley paper mill exploded, putting the computer out of action.

And three years ago Mike Roberts, an assistant ops manager at the company's Northfleet installation, was awakened with an early morning phone call.

"The computer's blown up," said one of his night shift operators.

"Don't muck me about," said Roberts, maybe

thinking along the lines of a disc head crash or a hardware parity error.

"No, it's blown up," insisted the operator.

What had happened was that a central heating boiler had exploded beneath the computer room and an ICL 2803 had fallen through the floor.

"Teetering on the edge of the crater was the console table, so the bold ops manager crept into the wreckage to type 'die' - and the machine quietly pegged out."

It's the operator that gets the blame

WHEN the buck is passed in computer installations, it often stops with the computer operator. It is the operator who traditionally gets the tough end of the stick.

Existing closer to the bowels of the machine than anybody else, operators have a dual role. On the one hand they must wrestle with the psychology of the equipment and its operating system, while on the other they must deal with the programme analysts and users.

For the moment, analysts there are not many skills enough to cope with computer-based problems and consider the difficulties

caused by other people.

Any individual who is the victim of a computer foul-up will, given half a chance, go for the people with their fingers on the buttons - the operators. From the apologetic consumer with an outrageous rates demand to an office manager who is running behind schedule, it's the same old story - blame the operators.

In fact, management is particularly guilty of blaming the operators for what, all too often, are programming errors.

Management should know better, that is what it is paid for.

As for the programmers... Regardless of whether it leads to harmony or not, programmers and operators regard each other as separate breeds. At times their hostility towards each other can make D-Day look like a game of croquet.

Programmers are prone to think of operators as too-operative and half-educated, jealously guarding the machine behind elaborate security arrangements. Starved of fresh air and daylight, the operator is characterised as a creature without normal human responses.

Many operators have responded

Are mere men afraid of the dark?

CAST your mind back to the beginning of September when this page quoted Robin Weldon, DP manager at Eastbourne water works, as saying, "Lady operators are conscientious, but reluctant to work at night."

He backed up the observation with his experience of a lady who had vowed to eschew night shifts due to her fear of strange nocturnal noises.

Disruption

June Punnett, an operator on Southampton University's 2900, replies, "The main reason that people (not just women) dislike the idea of night work is the disruption of normal routine in both home and social life. Due to the domestic role of most women, they find it more difficult to adapt their routine in different hours."

She is talking from the experience of having worked a 24-hour, three-shift system for the past five months and says, "I would urge women not to shun shift work without giving it a proper trial."

Spiders?

She has found that shift work has not restricted her freedom, cramped her social life or made her marriage suffer, and calls on Mr Weldon, "as a gentleman LPL manager to tell us what he is afraid of. Is it spiders, the dark, enclosed spaces... or female domination?"

Mr Weldon, speak up!

ELBIT MOVES DOWN-MARKET WITH MICROPACT

Micro from Israel based on twin Z80s

AS well as preparing to enter the lower end of the IBM plug-compatible market with its Anat processor, now licensed to Nixdorf as the 8890 (CW, September 25), Israel's Elbit is moving down-market with a microcomputer based on twin Z80s.

Called the MicroPact, the unit has the processor built into a desktop display unit, offered with separate twin eight inch floppy disc drives. Minifloppy drives are also available, as well as hard discs of between 12 and 96 megabytes capacity.

The unit comes with two serial and two parallel ports, and the most attractive feature is the software. It is offered with the highly-regarded UCSD, University of California at San Diego, "Pascal operating system" as well as the

widely-used CP/M operating system.

As well as Pascal and Basic, Cobol and Fortran are also supported, and the basic unit is priced at under £2,000 in OEM quantities.

The MicroPact is an extension of Elbit's new DS2000 VDU, which also incorporates a Z80A.

First two applications of the MicroPact in Israel are at the Discount Bank in Tel Aviv, and inventory control at Elbit itself.

The Discount Bank is using the MicroPact to enter close of business prices on the Tel Aviv stock exchange. The prices are entered on a master terminal backed by a floppy drive, and the information is distributed around the bank via other terminals.

Elbit does not envisage versions of all its products, since a substantial part of its business is military, both with the Israeli armed forces and for export.

A ruggedised MicroPact is one offered in the UK at the moment, but would cost about three times the price for the standard version.

Software house moves into micros

A LONDON-BASED software house, Ludhouse, of Streatham Vale, has moved into the microcomputer systems business with a range of machines based on the Bystronix Megamicro that run the Ludhouse set of standard accounting packages.

On the hardware side the basic Ludhouse system costs £8,000 and comes with 48K bytes of main memory, a double sided floppy disc system which can hold 1.2 and 2.4 megabyte depending on the density, a 120 cps matrix printer and one VDU.

Applications packages range in price from £250 for cash flow forecasting to £2,000 for contract costing while sales purchase and nominal ledger each costs £500.

Payroll is priced at £480 while a combined sales ledger, invoicing and stock control system costs £1,000.

Systems software consists of the ubiquitous CP/M from Digital Research, and languages supported include Basic and Microsoft's Cobol.

Attributes of its software highlighted by Ludhouse include automatic audit trail, full integration of all ledgers to final accounts, the ability to handle changing discs, to post the next line item, year before closing down the previous and to handle both unallocated cash and part payments against invoices. Free format final accounts reports are available at call.

Up to six months ago, Ludhouse was called Robson's Computer Advisory Services.

The Bundespost has given approval for attachment to the telephone network of the keypad terminals that are to be in use by 650 main dealers by December. Traffic on the system is expected by then to be over 7,000 orders a day.

The system is to handle 24 telephone lines and be linked to Ford's IBM 370/158 for real time updating of stock records. Part numbers and quantities required are input from keypads that use three tone multifrequency signalling, like the latest push-button telephones.

The system responds with a recorded voice message transmitted from words stored on disc.

The order, worth about £120,000, was won in competition with Racal.

University twins

UNIVERSITY of London has ordered twin 2956 systems from ICL for handling jobs like financial control and student record processing in its Management Systems Division. They will be installed at the University's Senate House installation in central London, replacing a 1903T. New systems will be developed under VME/K.

LT contract for Ferranti

LONDON TRANSPORT has placed a £65,000 development contract with Ferranti for a double ring communications system for the control of train signals. Ferranti is to provide a trial system to prove the design concepts before they are applied to a stretch of track at the northern end of the Piccadilly Line.

Nodes are to be based on Ferranti Argus 700F minis and the serial links in the ring will run at 9,600 bps, while links to local controllers will run at 1,200 bps.



Elbit's star programmer puts the MicroPact through its Pascal paces at the company's headquarters in Haifa, Israel. The floppy disc unit is on the floor. The programmer, who declared, "I don't deny it" when one of his colleagues described him as a genius had taught himself Pascal and after three weeks was writing file, dump and other utilities for the MicroPact.

Rapid fall in values of used IBM machines predicted in US report

FUTURE values of used IBM and certain compatible machines will fall rapidly, according to a new report by Computer Financial Inc, a US leasing company that is betting its own future on the accuracy of its forecast.

The prediction is based on a mathematical model which uses trends in technology over the last 30 years as well as IBM's pricing patterns and what CFI calls "user psychology". This gives predictions in dollars of the secondhand value of IBM products and key competitors' offerings.

It also predicts monthly lease rates, which are related to sale prices but in many cases do not track them exactly, according to CFI.

The leasing company's study advocates a conservative approach to, for example, IBM 370 mainframe values, and instances losses among leasing companies and their backers as supporting evidence.

"Peripherals do not follow the same pattern as mainframes, the study adds, in part because many have significant mechanical costs which do not decline in the way

semiconductor prices have. IBM's rate of introduction of new peripheral devices is also not as consistent as that of mainframes."

The CFI study costs \$400 which buys a year's supply of updates and background data. Also available are studies on various product groups, ranging from \$200 for a 3340/3344 disc drive forecast to \$900 for a 3033 report.

The full set costs \$12,000 and are available from Computer Financial Inc, One University Plaza, Hackensack, New Jersey 07601, US.

RTL/2 users to meet

THE 1980 annual meeting of the RTL/2 user group is to be held at the Park Court Hotel, Lancaster Gate, London, on October 7 and 8. Papers are invited on such themes as the handling of data structures, microcomputer applications and performance evaluation.

For further information contact Caroline Hynes of SPL at 630 7833.

FUNGUS AUTUMN PHONE-IN SALE

The following new and secondhand equipment is available for ex-stock delivery

Second-hand equipment all available for ex-stock delivery

DEC MM1 16K 18K Word Core Memory	£650
DEC LA38 DECwriter with FUNGUS Speed-Up Module to 185 cps	£1,000
PLESSEY MM1116 16K Word Core	£450
DEC MF11U 16K Word Core and Backplane	£1,000
DEC MM11U 18K Word Core Add in Memory to MF11	£600
DEC TU10 9 Track and 7 Track Sinter Tape Transports in Cabinets	£1,500
New RPD 200 Mb Disk Drives Single and Dual Ported, Ex-Stock	£16,750
New RMQ3 87 Mb Disk Drives Ex-Stock	£9,500
Reluctant Memories 860, 20Mb Disk Drives (RPQ3 Compatible) (Controllers Available)	£2,500
Reluctant C.D.C. 9746 40 Mb Disk Drives (RPQ3 Compatible) (Controllers Available)	£3,500
DRICO Cartridge Disk Drive (RK05 Compatible) (Controllers Available)	£1,750
C.D.C. 9322 Drum Printers with PDP 11 Interface	£2,000
2.4 Mb	£1,500
4.8 Mb	£2,500

New equipment available now from stock

DEC MS11P 8K WDS Memory	£350
DEC MS11P 16K WDS Memory	£500
DEC KY11LB Program Console	£470
DEC LA38C DECwriter	£850
DEC RK21 180 Controller and Dual Drive	£2,300
DEC BA11K Expansion Box	£1,700
DEC DE11A Bus Repeater	£1,040
DEC M9312 Bootstrap	£400
DEC DL11W Serial Interface	£450
DEC LA120 DECwriter III	£1,550
DEC MU11BE PDP 11/70 64K Core Memory Expansion	£5,500

PDP 11/35 with 128 Kb memory; 5301 controller; 2-off 40 Mb disk drives 1-off MKII V.D.U. RSTS licence V7 Three systems only available at

£12,750 each

This system is as detailed above, but is based on the PDP 11/34 processor. Three systems only available at

£16,250 each

More value from the FUNGUS Compatible Product Range and most items available for immediate delivery

7530 300 LPM Band Printer including PDP 11 Interface	£4,725
7560 600 LPM Band Printer including PDP 11 Interface	£6,400
7430 NRZ2PE 9 Track Deck and Controller	£5,060
7285 64K Word MOS Memory with Clock	£1,250
7821 Single Serial Interface	£375
7384 C.D.C. 9764 128 Mb S.M.O. Drive and PDP 11 Controller	£11,500
7824 4 Line Serial Interface	£925
7825 8 Line Serial Interface	£550
7267 512 X Byte 11/70 MOS Memory in Cassettes	£14,570
7268 128 X Byte 11/70 MOS Memory Expansion	£4,650
755 F100 Visual Display Unit (VT100 Compatible)	£1,050
Canonica 702 Front Feed Serial Printer	£2,750
7741 F120K S.R. Printer Terminal	£1,450
7692 700 cps Paper Tape Reader with PDP 11 Interface	£1,500
7560 Paper Tape Station 700 cps Reader, 70 cps Punch with PDP 11 Interface	£3,500

FUNGUS also have a large selection of disc storage sub systems ranging from 2.4 Mb to 256 Mb configurations. Phone now for further details.

COMPANY NEWS

Finance groups buy 34% of CGS

SEVERAL big financial organisations have taken over the 49% share in C&I Gemini Segel Ltd since 1973 by C&I, the computer services subsidiary of the French Atomic Energy Commission. The group of financial investors includes: Credit Lyonnais, Société Lyonnaise des Dépôts et de Groupes Dronat, BNP, the majority of the group's share capital remains in the hands of founder Serge Kamf.

According to C&I this realignment of a large minority of its share capital was undertaken so

as to associate the financial sector more closely with the company.

In 1979 the consolidated turnover of the CGS group amounted to \$113 million, an increase of 28% over 1978, with a net consolidated profit after tax of \$5.5 million. The group expects to chalk up a turnover of \$143 million and \$7 million net profits this year.

Retaining the 10% shareholding in CGS that it acquired last year is International Aeradio. At the time the two organisations set up a

joint venture based in London called IAL-Gemini which combined Gemini UK with the computer systems division of IAL.

The deal gave CGS access to the Middle East, the Far East, Africa and North America, areas where the IAL presence is relatively strong and, in return, CGS undertook to sell IAL's data communications and aviation systems throughout Europe.

The total CGS group workforce worldwide currently stands at 3,000.

Grand Met's bid to boost DP sales

GRAND METROPOLITAN, the giant catering and brewing group, is setting up a holding company called Grand Metropolitan Information Services in a bid to boost sales of its DP products to outside users.

GIMS was formed from Grand Met Information Processing, GRIP, which was set up by the group in 1972 to handle its computer activities. The GRIP, GIMS is based at Uxbridge, Middlesex.

GIMS embraces three trading subsidiaries, Grand Metropolitan

Systems Ltd, GMSL, Metrotech Management Technology and GIM Bureau Services.

GIMS was set up two years ago. Metrotech is about a year old and GIM Bureau Services is a newly formed operation. Its managing director is Bill Brant, formerly production director at BOC Data-

Its data processing is handled by mainframes at Uxbridge, including IBM, IBM compatible and ICL 1900 kit. Nearly all its work is for Grand Met.

Schlumberger to buy US bureau

THE firm that bought Fairchild Canada and Instrument last year, Schlumberger, has reached an agreement in principle to buy US bureau Manufacturing Data Systems of Ann Arbor, Michigan.

Under the terms of the agreement Schlumberger is swapping about 1,270,000 of its shares for the 2,987,000 Manufacturing Data shares outstanding. This values the deal at \$189 million.

Complicating the transaction slightly is that Schlumberger's shares were recently split on a three-for-two basis but the

numbers and value of them quoted above are pre-split.

Manufacturing Data supplies software for numerically controlled machine tools and other services for the machine tool industry.

Schlumberger products include instruments for oil exploration and controls for electric power distribution. Through Fairchild it is now also a major manufacturer of semiconductor, although Fairchild operates on a separate subsidiary.

Reshuffle blamed for CMG profits dive

A MAJOR reshuffle, in which over half the management changed jobs, caused a dive in profits at Computer Management Group last year. Profits dropped from £1 million in 1978-9 to £215,000 last year on a turnover up 21% at £4.3 million.

The changes were made as part of the Croydon-based firm's plans to reach £100 million turnover by the end of the decade, said director Chris Harrison.

The 600 employees have waived their share of the profits from last year. In April 1979 they received £558,000.

Pre-tax profits rose 38% to £507,000 after the waiver and the dividend was increased to 17p (14p last year) per 5p share. Net assets increased 26 per cent to £245,000. Last year CMG saw the software

and consultancy side of its business outgrow its bureau services to account for 58% of turnover, and also witnessed an expansion of the group's activities in Holland. Dutch turnover now almost matches that in the UK though its true growth was obscured by the strength of sterling against the guilder, says CMG.

Authorised capital was increased by 200,000 to one million 5p shares last year and a profit-sharing scheme established for employees under the 1978 Finance Act.

All employees have the chance to buy shares in the company, and 380 have taken up the offer. Some 26,000 will be bought this year and an option offered for an issue in September 1981. The 1979 premium was £3.30 per share.

Turnover up 37% at STC

TOTAL turnover up 37% to more than £256 million and profits increased by 43% to nearly £30 million are highlights of the financial results reported by Standard Telephones and Cables, the UK subsidiary of ITT, for the first 25 weeks ended June 22 of its current financial year.

Turnover from telecommunications and electronics products increased by an impressive 50% to over £159 million while the side of STC's business that covers components and distributors grew by a more modest 20%.

Net profits increased by less than 10% to £13.7 million last year because STC's tax payments jumped from £3.5 million last year to £9.1 million this year.

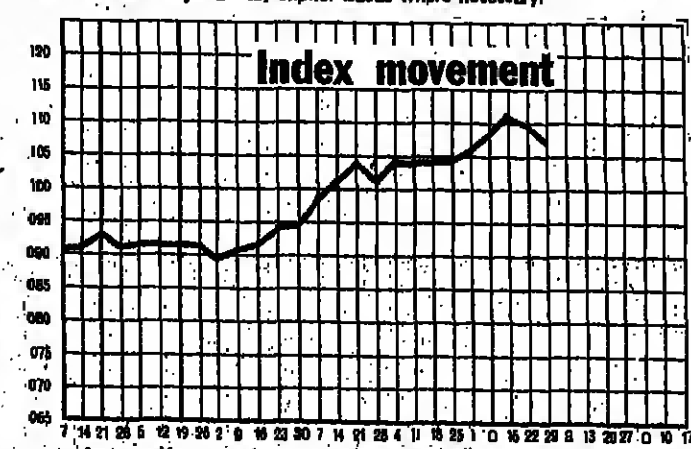
Two merge

RECRUITMENT consultants Cap Associates of Croydon and OCC Computer Personnel are merging.

CW SHARES TABLE

London Stock Exchange				US Stocks			
Code	Stock	Price	Change	Code	Stock	Price	Change
250	Admiral	250	0	250	Admiral	250	0
251	Anglo	251	0	251	Anglo	251	0
252	Auto Data	252	0	252	Auto Data	252	0
253	Barrington	253	0	253	Barrington	253	0
254	Comp Systems	254	0	254	Comp Systems	254	0
255	Comp Systems	255	0	255	Comp Systems	255	0
256	Comp Systems	256	0	256	Comp Systems	256	0
257	Comp Systems	257	0	257	Comp Systems	257	0
258	Comp Systems	258	0	258	Comp Systems	258	0
259	Comp Systems	259	0	259	Comp Systems	259	0
260	Comp Systems	260	0	260	Comp Systems	260	0

The table shows the closing prices in London on Friday and in America on Thursday. The share index is based on the prices of the UK companies in the table. Highs and Lows have been adjusted for capital issues where necessary.

MICHIE'S PRIVATEVIEW
Why Artificial Intelligence is good medicine

THE 6th AIM Workshop which recently ended a week-long meeting at Stanford, US, was something of a milestone.

I should first explain that AIM stands for Artificial Intelligence applied to Medicine and that the nationwide community of researchers assembled under the AIM banner was largely the creation of two men.

Joshua Lederberg gained the Nobel Prize many years ago for work in genetics, including the discovery that bacteria too have sex, and went on to write the first code for the Dendral expert system. Ed Feigenbaum, one of the pioneers of AI, is chairman of the world's leading Department of Computer Science, within which the Stanford Heuristic Programming Project has flourished since the 1960s.

British computing people will be able to hear him or the November State-of-the-Art Conference in celebration of Infotech's 10th anniversary. He will be speaking on Expert Systems in the 1980s.

Monitored

The AIM meeting was a milestone because the involvement of clinicians has manifestly become total. Scarcely a project of the dozens reported from around the US (and from AIM's out-station in Japan) but consists of clinicians working with computer people in close formation.

The latest report on the VM (Ventilator Management) program gave a good idea of what can be done. VM's task is to interpret streams of physiological data which are automatically monitored from post-operative patients in the intensive care unit at San Francisco's Pacific Medical centre. The program volunteers advice in real time and gives status reports and recommendations on demand.

Based on the EMMYCIN production-rule ideas mentioned from time to time in this column, VM makes an innovation by dynamically adjusting the pattern-parts of rules - essentially by altering in response to changing circumstances the numerical thresholds delimiting such ethical concepts as "normal", "within the acceptable range" etc.

Lucky

System performance does not quite attain to the standards set by a top specialist. But the patient enjoys the presence of a specialist by his bed at most half-an-hour in the 24-hour cycle.

What of the other times when things start going wrong, for example in the middle of the night? Maybe a houseman, possibly inexperienced, is on call. Maybe a nurse and/or student will have to take the decisions. At times like those, all concerned count themselves lucky to have VM's knowledge-based intelligence on tap. In intensive care units time does not stand still.

There was no room for doubt at the Stanford gathering that a healthy flow of professional benefit was proceeding in both directions.

TEN YEARS AGO...

From Computer Weekly of October 1, 1970.

WITH the System 370/145 IBM has introduced a new contender into a sector of the market now dominated by 360/20, 40 and 50 installations. A cost of arms dinner for members, and a presidential award are innovations to greet members of the British Computer Society at their 13th annual meeting. The Software Houses Association Ltd has emerged as a trade association with the specific aim of representing the British software industry. In a drive to increase sales of the Nova and Superno minicomputers, Data General Corp. of Massachusetts has opened sales offices in London and Germany. Recal Therapeutics, of Hythe, Southampton, has announced the entry into the computer peripherals market with three data storage units.

Hilton Hotel speeds up international bookings

TRAVELLERS in London and Paris can now expect a quicker and more efficient response to inquiries about a room at the Hilton.

Hilton booking offices in those cities have recently gone online to the Hilton's hotel reservation and front office management system.

Called Hilton, the system enables a person in London, for instance, to inquire about reservations in London, Paris and all of North America, from

Canada to Puerto Rico.

Each reservation centre has a Cartafone 7980 VDU and a Diablo printer and links to an IBM 370/158 in Dallas, Texas. The system uses CDC System 17 teleprocessing software.

The centre runs the system live for 20 out of every 24 hours, with the remaining four hours used for system maintenance.

Hilton is available from 10am in London and

starts up at 11am local time in Paris.

According to the company, Hilton enables reservations to be made within two minutes and so reduces the time the caller has to spend on the telephone.

Features of the system include the verification of reservation information, access to inventory for some 300 hotels, and automatic confirmation for posting to the travel agent or customer.

Electronic multi-media document storage system developed in UK

A DOCUMENT retrieval system which can store information on paper or microfilm or in video or digitised form, is being developed by Antone Systems of Fareham, Hants.

Called Astra, Antone Systems Telecommunications Remote Access, it should enable multiple local and remote terminal users to gain access to millions of documents.

Antone is the firm that has taken over the image distribution systems that used to be sold by Stabletron of Fareham, and one of the major advantages to be offered by Astra over the earlier Stabletron systems is the use of digitised image storage. The Stabletron systems distributed only analogue images over coaxial cables.

Library

The main form of document mass storage will be microfilm or microfiche and Astra will probably use a high density linear charge coupled device array to capture a digitised image of the film frame.

The array will split the image into the desired number of pixels by physically moving across it. An A4 document would typically be divided into 1,000 x 2,000 pixels.

The control of document access will be taken care of by a computer, possibly a Digital Equipment LSI-11, making use of a magnetic disc based index or library. A weighting factor will be applied so that frequently used documents will probably be held in an "active" part of the library while documents used less often will be listed in a "passive" section.

Storing digitised images on magnetic disc is recognised by Antone as expensive, but will be necessary where buffer storage is needed to hold a document temporarily when a user is "browsing" through the microfiche file.

The storage of images in digitised form offers the major advantage of being able to enhance and manipulate them using software. Line drawings can be "zoomed" to enlarge detail, for example.

Images will be converted from digital to analogue before displaying on the Astra terminals, each of

which will be able to have a low cost printer for producing a hard copy of tolerable quality in about 10 seconds. Alternatively, production of a high quality hard copy of an image will be possible, while it is still in digitised form using a matrix printer. The third alternative method of producing hard copy will be simply taking it from the microfiche frame, a fairly slow semi-manual method.

The microfiche store that Antone plans to use for high speed retrieval will be able to hold up to 400,000 A4 documents with a maximum access time for any document of six seconds and an average of three seconds. Each fiche will probably hold 512 A4 frames.

Retrieval

Microfiche is simply cut 105mm roll film and Antone is also looking at the use of continuous 105mm film for automatic retrieval. A system handling this film could hold more than two million A4 documents and afford an access time of less than 10 seconds.



Kienzie's Sicob launch

THE Kienzie 9055, launched in France at Sicob and shown here on the company's stand, is a Rollei-type replacement for the lowly VHS. A single station single user system at present, it is driven by the mighty Texas Instruments TMS 9900 16-bit microprocessor and features a printer which does everything the operator wanted but did not dare to ask for, plus one or two things he never even thought of.

It takes continuous fanfold paper, single sheets or standard account forms, and features a unique automatic insertion facility for continuous stationery. Selection of the printing medium can be under program control.

Fanfold paper can also be cut manually or under program

control, the messages flash up on the screen to warn the operator of the state of the printer. Thus it is a needle in the matrix breaker, a message "Please replace needlehead" comes up on the screen, and a message is also flashed when the ribbon is worn and needs replacing.

It is necessary to lift the lid of the printer - as shown in the picture - to change the paper and so forth, and a nice touch is that the music stand for ledger cards and other documents neatly realigns itself so that the papers stay put, and return to its normal position when the lid is closed. The printer runs at 240 cph and prints bidirectionally.

Two or four 5-megabyte disc units are supported.

Videotape storage firm sells Micropad

THE Quest Micropad handwriting data entry system is now being marketed in France and Belgium by Correlative Systems, a Belgian company. Its principal offering is the videotape archival document storage system, which currently has three users, the CETUP service bureau for insurance companies in Paris, the FIEC Commission in Brussels, and the Credit Communal de Belgique bank.

At Sicob the company showed a combined CSR 2000 optical mark reader and CSR M2007 magnetic ink character recognition system, also for use with the videotape storage system. Formerly called Videofiche, the system has been renamed VIPS, Virtual Image Processing System, because videofiche sounded too down-market.

Talks

At present Correlative Systems uses General Automation minicomputers to front-end its videotape systems, but the link is in doubt, and talks are going on with several other companies, notably CII-Honeywell Bull for the Mini 6 known in the Honeywell world as Level 6) and with SEMS about its Sinar units.

Correlative Systems had a turnover of FF 22 million, about £2.2 million, last year and looks for two more VIPS systems in Paris and one in Marseille by the end of the year.

Meanwhile Micropad builder, Quest, has introduced a significant new product in its other main area of business, computer-aided design systems. The product is a raster scan colour display for printed circuit board representations.

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Model VI

The Model VI Pentland VDU has an additional bonded tape drive with green phosphor, 90 upper and lower case, XY cursor addressing and optional displayable control codes.

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PEOPLE and EVENTS

Former Exxon man 'stung' by Hornet

AN alleged attempt to sell stolen plans of a new line of Qyx word processors to IBM, has led to the arrest of former Exxon Enterprises executive, Orion Briel. The plans were for a forthcoming line of Qyx machines, called the Hornet series. An Exxon security official had earlier reported that the Hornet plans were missing from the company's headquarters.

According to US District Court papers, Briel left his job as manager of Qyx's marketing publications operation on August 14. On August 15, he allegedly wrote to Dan McLaughlin, vice-president of marketing for IBM's office products division in Franklin Lakes, New Jersey, offering to sell the Hornet plans to him. McLaughlin notified the FBI of Briel's alleged offer.

On August 22, an unidentified FBI agent, with Exxon engineer Jack Akin, met Briel at a highway restaurant outside Philadelphia. The two posed as IBM representatives, sent by McLaughlin to discuss the purchase of the Hornet Plans from Briel.

Briel allegedly detailed various aspects of the Hornet line, as well as of other company projects. He is said to have offered the Hornet documents for \$100,000. Briel was arrested and charged with mail fraud.

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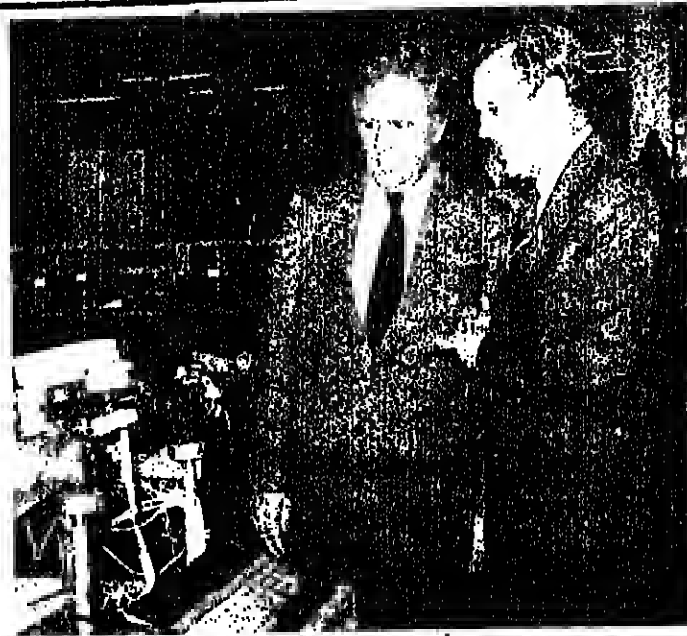
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Our picture shows Alex Fletcher, Under Secretary of State for Scotland and Minister responsible for Industry and Education, on a visit to the Burroughs Cumbernault plant. On the right is Eddie Handrahan, general manager at Cumbernault. Fletcher was shown the B90 computer which was designed and developed at the Scottish plant.

Janet Adams has joined the Rochford-Thompson Group as public relations officer. She was formerly vice-chairwoman of the Southern PR Link Group and secretary of the Kea Thomas Body Scanner Appeal.

Eddie Orzechowski has left Wakefield Metropolitan District Council, where he was computer development officer for six years, to join Computer Machinery Company as territory manager.

Finance chief for Intel

WILLIAM WESTMAN has been named vice-president of finance at Intel Corp. He replaces Laurence Hootnick, who was promoted to vice-president of finance and administration for the company.

Westman joins Intel from Hooker Chemical Corp in Niagara Falls, New York, where he was vice-president of finance for two years. Before that, he held various financial posts with BASF and General Motors.

UKAPE new president

ROY DAVEY has taken over as president of the United Kingdom Association of Professional Engineers (UKAPE).

He has been a member of the association for eight years, and is a construction engineer for ICI Fibres, based in Teesside.

Davey is currently chairman of the Industrial Relations Committee. He became a student member of the Institution of Electronic and Radio Engineers in 1960, a graduate member in 1963, and a chartered engineer in 1965.

Commenting on the new appointment, Davey said "It will be one of my main tasks during my term of office to encourage and foster as much involvement as possible in the association's affairs at grassroots, and to enhance the role of the professional engineer wherever he may work."

David Markby has been appointed managing director of Leasco Software. He joined the company in 1970 as project manager, and in 1978 became operations director.

Lydiastar has appointed Alex Groodnyck as marketing executive. He joined the company on completion of a management training scheme.



Buesst

Morrell

Ursula Buesst has been appointed regional manager, central region at International. She previously spent 18 months working in Melbourne, Australia, as freelance consultant for Australian production companies.

Austin Morrell has been appointed sales executive for the MSI North of England region. He was formerly with Harris Systems.

Richard Shlemmer has joined Gpher Data Products Inc as director of human resources. He was previously director of employee and community relations at MSI Data Corp.

Redfin has made two new appointments. They are Steve Hibben, who joins as territory manager for the Southern Region and Howard Seddon, territory manager for the Northern branch. Hibben was previously sales manager with Memorex, and Seddon was sales manager with Applied Computer Systems.

Nigel Barnard is now territory manager with Computer Machinery Company responsible for sales in Berkshire and West Oxon. He was formerly with Datasil, where he was application software salesman.

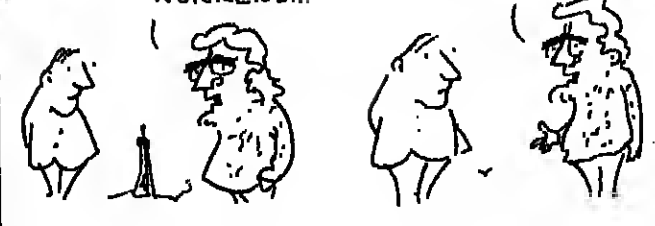
Eddie Sims, chairman of GEC Pagar, Liverpool, has been elected the 1980/81 chairman of the Electrical Installation Equipment Manufacturers Association (EIEEMA). Grant Bewick, managing director of Kenneth E. Bewick Ltd, is vice chairman.

Derek Cook has been appointed field sales manager for CIL. He was formerly with Micropuffs in the US.

Liveness File

by Don

HOW HAVE THE BRITISH LEYLAND WORKERS... ...TAKEN THE USE OF SO MANY ROBOTS?



...FINE! THE ONLY SQUABBLE IS OVER... ...WHOSE UNION THEY SHOULD JOIN!

DIARY

OCTOBER 6-7: Seminar: Digital communications for satellites. Transfer Society (TTS), London. (01) 242 4045.

OCTOBER 7: Automation and the office worker. Simon O'Leary, Birmingham branch IDPM. Saracen's Head, Stafford Road, Shirley. 7.30pm.

OCTOBER 8: Annual General Meeting. BCS. The Council House, Birmingham. 8.30pm.

OCTOBER 13-14: Seminar: Digital communications for satellites. Technology Transfer Society. Manchester. (01) 242 4045.

OCTOBER 14: Seminar: International technical marketing. Technical Marketing Society of America/TTS. London.

OCTOBER 14: Meeting. The microcomputer: a complete package for the smaller user. A. Cones, Hull branch IDPM. Hull City Hotel, Ferry Road, North Humberside. 7.15pm.

Meeting. Long haul optical fibre digital systems. IEEE. Birmingham. 8.15pm. Tel: (01) 636 3357.

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Caught in the middle of the Iran-Iraq conflict was Logica consultant SHAUN O'BYRNE, who flew to Baghdad on Friday, September 19, and was lucky to escape on the last flight out of Baghdad on Monday, September 22.

The events described

below are in his own words.

O'Byrne has been with Logica for four years and is a principal consultant with its communications group. Prior to joining the firm, he was with minicomputer manufacturers Modcomp and Varian.



O'Byrne

LOGICA MAN'S NARROW ESCAPE

'I was on the last flight from Baghdad'

DAY 1, Sept 19

GET up early and pack, eagerly looking forward to my first Middle East assignment. I am booked to fly to Baghdad, to discuss with an oil company there the possibility of Logica undertaking a feasibility study and implementation project involving just about every computer skill you can think of. Our Friday is Iraq's day-of-rest, hence the trip out today to get in a full working weekend.

Straightaway things go wrong! Heathrow is 12 miles from Weybridge, the traffic is heavy and I am booked on the 9.30 am trip! Get to Terminal 3 with only 10 minutes to go - ticket advises an hour - and I scream "hand baggage only" to the check-in girl.

She tells me that I have probably missed it but presents me with a yellow-striped pass stamped "Have-A-Go". This, she explains in five seconds flat, will get me through passport control and security quickly but does not guarantee the plane will be at the other end.

It works. I run flat-out the entire length of the airport, through gate 10, to the Boeing 707 and collapse wheezing into my seat. We do not take off for another half-hour.

Once airborne I settle in and re-read the client's original requirements spec. We stop over at Beirut for 20 minutes where half the load gets off.

As we take off, I spot a used Daily Telegraph. "Iraq-Iran Situation Tense" reads its headline. A quick doze and wheels down to land at 5.30 pm their time (two hours ahead of UK).

We are ominously warned that photographs of Baghdad airport are forbidden and that all cameras should be concealed until well past Customs.

A quick look out of the porthole explains all: there below us are lines of bombers, MiG jets and many troops. Baghdad is both a military and civil airport.

On the ground the temperature is 90°F and we are ferried to passport control.

I am pleased to meet up with Ian, our Middle East salesman who has flown in earlier from Bahrain.

Problem. Ian tells me that all of Baghdad's hotels are "full" - booked by the government in anticipation of the World Trade Fair due to start in October.

We decide to get a taxi to the centre of town and search for there. I quickly learn that Iraqi driving is worse than Italian. Everyone, it seems, has a car and everyone continuously beeps their horns as they drive flat-out, overtaking on all sides.

An hour or so later we book into

an hotel - an amazing place: my room is about 12 feet by five plus a bathroom.

There are no windows, the plumbing is rickety and the huge, three-blade fan attached to the ceiling looks as though it will come off any moment and take half the hotel with it.

Still, the bed is good, the water hot and the shower works a treat. After a beer with Ian - Iraq is very "wet" - we turn in. We have to meet the client tomorrow and Iraq's working day is 7.30 am to 2 pm.

DAY 2, Sept 20

A restless night. I am just about to doze off when, at first light, the chap in the next room starts wailing to Allah and then turns on his radio for the National Anthem. I get up.

Down to breakfast: tea, Iraqi loaf and jam and bottles of 7-Up. Ian tells me BBC World News has just announced the mobilisation of Iran's armed forces.

At 8.30 the oil company's PR man arrives with chauffeur and drives us out of town to their new computer centre. An impressive building complete with air-conditioning, Austrian furniture and an expensive Japanese mainframe. If the project goes ahead our lads should be happy to work here.

The meeting with their computer team lasts about two hours and covers a lot of ground: equipment, information flow, training needs, timescales, costs and contracts.

Their leader, a good systems man, explains that he now has to get the go-ahead from above and asks us to wait for a day or two at our hotel for him to call.

Into the American Bar of the Omar Khayyam hotel for a beer and then into yes, a Wimpy bar, to be served by an Egyptian medical student in Baghdad to earn money.

DAY 3, Sept 21

Overstayed. Up at 8.00 am, quick shower and down to breakfast where Ian says he has just heard that Iraq has shelled eight Iranian navy boats. Beginning to feel uneasy.

Ian has to see a client and I decide to go to the Rafidain (State) bank and cash a traveller's cheque. I find a bank easily, but get hopelessly lost in the back streets of Baghdad.

The colour TV in the lobby keeps flashing up maps of the Iraq-Iran border. I wish I knew what the announcer was saying.

Still no call from the oil company and so we decide to pay a courtesy call on Iraq's National Computing Centre (NCC). Another nice new building hous-

ing a large Honeywell installation for national number crunching. Nice people. We arrange for them to meet with Logica when they visit the UK in late October.

After visit is over we provisionally book flights out of Baghdad - myself to London via Geneva and Ian back to Bahrain - for tomorrow. Back at the hotel, still no contact by the oil company. More newswatches on TV.

That evening two of Logica's clients, a lieutenant-colonel and a captain in the Iraqi army, pop in for a drink and chat about a training programme for their computer staff.

Once the business content is over we turn to the "Death of a Princess" film, the PLO, BBC and neighbourhood. Ian invites them to stay for dinner but they say they are "busy" at the moment. We know what they mean.



Robot arms at work on a Metro body shell at British Leyland's Longbridge plant.

CONTROLLING THE METRO

Computers take over on the car production lines

THE need for British Leyland to make dramatic improvements in both productivity and quality has been stressed by the company's management on many occasions. With the launch of the new Mini Metro, the time has come for action to speak louder than words.

As reported last week a tour of the factory at Longbridge suggests that the necessary action will indeed happen. What you can't see simply by looking at the impressive array of automated equipment and by watching Metros slowly taking shape with barely one helping hand, is the crucial part played by computer systems.

A total of 24 computer systems which, with software, are worth £3.5 million, control the produc-

tion of Metros, not only to the extent of monitoring the various processes but also to managing the stocks of components and sub-assemblies and further to ensuring production matches the sales orders received.

Interlinking

This involved a very complex interlinking of all the various computer systems and the development of control software which British Leyland is confident is more advanced than that used anywhere else in Europe.

The computer hierarchy starts with British Leyland's Communication and Data Centre at Redditch. This is rather misleadingly referred to by the company as its CDC, and the computers therein as CDC mainframes - which must irritate IBM and Amdahl.

This centre stores all the basic data on orders, stock items and so on, and communicates with the master computer at Longbridge as required via British Leyland's microwave network.

The master computer is the second level in the hierarchy, and consists of dual DEC PDP-11/70. As the name suggests, it controls all the other 22 computers at Longbridge. It maintains its own file of orders outstanding, which is updated daily with the details of the previous day's production.

Also stored on this system is the weekly production programme, effectively a set of targets for each shift. Production is controlled by matching this production programme to the orders file to produce an actual list of cars to be built, taking into account the resources available.

Manages

This is more complicated than it sounds, as the specification of a given Metro varies according to several considerations - model type, colour, trim, engine size, market and so on.

The master control system records the progress of each vehicle as it moves through the plant, manages the store of unpainted car bodies, schedules the operations of the paint shop and then manages the progress of painted bodies through another store and into the finished assembly area.

It connects with six other systems dedicated to particular aspects of the production process, such as quality control, storage of body panels and production achievement monitoring.

The automated panel store is one of the most impressive aspects of the system: it is built by British Leyland to be the first which is both managed and controlled by computer. It was developed both to speed up panel movement and to reduce volume storage requirements.

It stores about 200 different body parts, and has a capacity of 7,800 complete car sets. It operates 24 hours a day, pulling pallets of parts in and out at a rate of one every 57 seconds. Only five people are needed to run the store.

Issues plan

Movements into the store are determined by movements out of the store, which in turn depend on the production programme. So the logical first step in the process is the formulation of an issues plan, in the form of an exploded list of components required matched against timescale.

This is established in advance for each shift. It can be manually overridden according to body production progress, to which rare adjustments are dynamically made by the computer to all other affected systems.

Once the issues plan has been established, the entry of new parts is directed in accordance. The idea here is that the cranes used in the warehouse should travel the shortest possible distance.

There are five aisles in the store, each with its own crane operating under the control of a Data General Nova 3. These computers and the conveyor belts used in the store are all under the control of a warehouse driver, a twin DEC PDP-11/34, which in turn communicates with the master computer.

The use of the warehouse driver ensures that the store can continue to operate even if both master computer processors go down. The warehouse driver instructs the crane control computers and controls incoming parts by directing them along a conveyor belt to a crane pick-up point.

The crane computers poll the cranes 50 times a second to establish

Continued on page 17

Single minded, double talking

You've got double the information access with one of the Plessey System 90 Terminal Systems. It links with two or more computers, of different types if needs be, at the same time - not just one.

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System 90's powerful mini-computer lets you work independently when you want. At the double, naturally.

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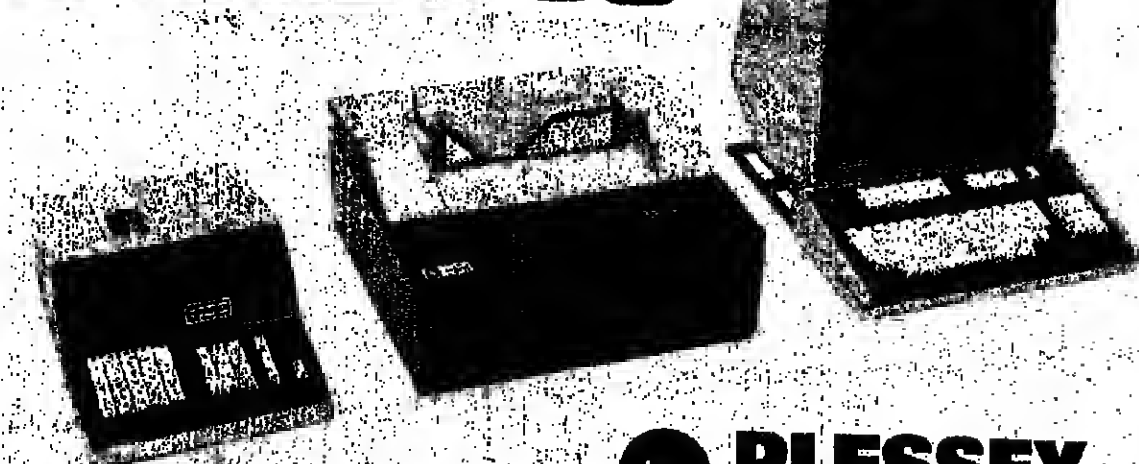
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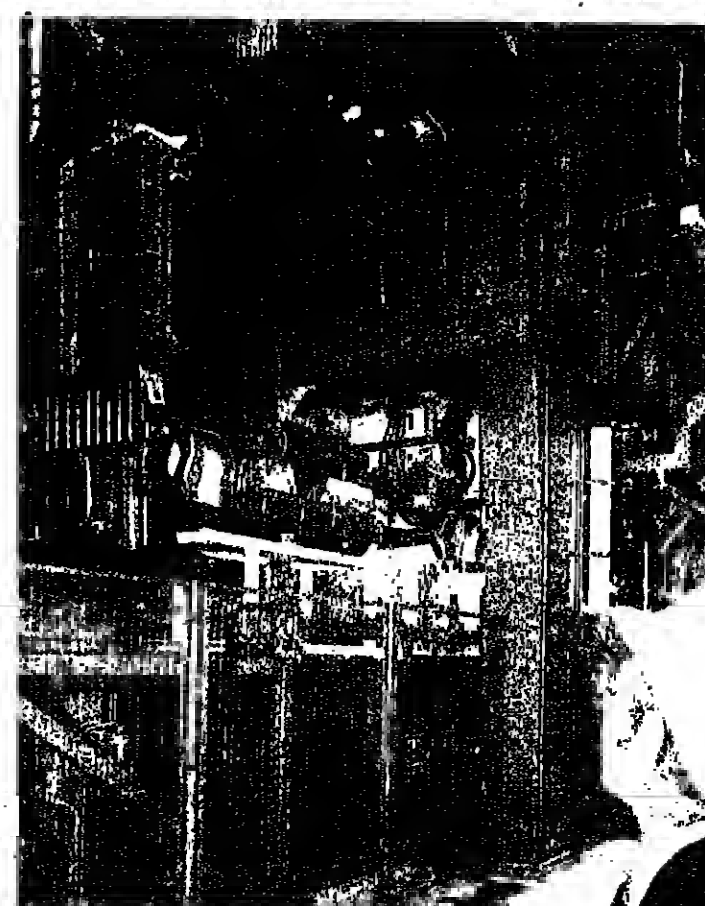
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How micros will help to save fuel

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It helps to save fuel in two ways. Engine, speed, crankshaft angle and manifold pressure are monitored to determine the optimum firing angle thus replacing mechanical timing. A second micro can provide carburettor control for the best fuel mix to engine speed ratio.

At the annual meeting of the British Association for the Advancement of Science, Professor M. J. Hampshire of Salford University said: "The trend is to combine these features, together with automatic transmission and cruise control, into one electronic engine control system."

He pointed to two major drawbacks which will have to be overcome before the micro based car is with us. These relate to software and to the severe conditions within an engine.

"One must ensure," said Professor Hampshire, "that a voltage spike preset at some input to the microcomputer does not cause the program to jump to some random point in the stored software."

"Producing a complete software package for automatic transmission control which avoids these dangers is very difficult indeed. The development of a new philosophy of software structure is required to solve the problem."

Temperature

He said that in a motor vehicle, electronic components must contend with temperature variations from -40 to +125°C, high humidity, salt and oil sprays and vibration. Still harsher is the electrical environment where such things as jump starting, electric body welding and load dump create extremes of electrical noise.

A load dump occurs when the battery is disconnected whilst the

engine is running causing the power bus to rise up to 140 volts for 400 microseconds.

As an example of electrical problems he said: "An innocuous stop light bulb has a cold resistance of half an ohm and demands a current surge of 24 amps before settling to a steady flow of 1.8 amps."

Danger

There are, of course, political implications to petrol conservation. At the same meeting of the British Association, Energy Secretary David Howell said: "It would be fatal for us to assume in Britain that our own North Sea oil excuses us from the need to reduce oil dependence."

In his estimate there is at least a decade of danger ahead during which oil based economies will remain hopelessly vulnerable to OPEC oil policies, or political action around the world.

Apart from saving petrol the micro will contribute to safety by providing the intelligence for information display, anti-aid and suspension systems.

Professor Hampshire commented: "It is obvious from past experience that the public will never create a market force which will cause manufacturers to introduce safety systems."

"In fact the reverse is true, that the public generates market resistance to the price penalty incurred by introducing safety measures. This is a clear case for government action to liaise with the industry."

The combination of market forces and governmental pressure promises rich pickings for the semiconductor houses and those associated with them.

By 1990 it is predicted that electronic systems will account for 8% of the cost of a vehicle.

There are over 30 million cars produced worldwide every year. Volkswagen reckons that, by the end of the decade, each car will have up to 10 micros dotted around it.

That's 300 million computers. The calculation of profits on that lot should put a smile on any executive's face and give a pocket calculator indigestion.

PAUL FISHER

Nick Enticknap sees how BL has switched to automation

'Master' updates progress map once every five seconds

From page 16

list where they are and whether they are ready to receive the next instruction. The cranes recognise where they are via infra-red sensors which identify storage locations from code plates, and calculate their desired path by comparing this with internally stored map of locations.

Before being entered to the store, arriving goods are first checked to ensure that they conform to specification and then to see that their arrival was expected. This is done by reading a bar-coded label affixed to the side of each pallet.

The information contained on this is then compared by the master computer with information previously transmitted to it when the pallet left the factory. In the case of all body panels, this is the Pressed Steel Fisher works at Swindon.

For extra reliability, the store is organised on the principle that each aisle is equally loaded. Thus

if one of the cranes becomes inoperative the disruption is minimal.

When components leave the automated panel store, they then go through a variety of processes which end with the production of unpainted body shells. It is from this point to the arrival of the cars on the final trim lines that the computer control procedures are at their most complex.

These procedures include passing the cars into and out of an unpainted body store, sending them through the paint shop and then into and out of a painted body store. The objective is to ensure that all parts of the factory operate at maximum efficiency.

The unpainted body store has a capacity of 140 bodies held in 10 storage lanes. Control of this store is by three microprocessor-based programmable logic controllers (PLCs), which interact with the master computer.

This computer creates paint shift schedules according to the

production requirements, then selects bodies from the unpainted body store and batches them by colour for each of the three paint shops. To do this it maintains a map of the store showing what type of body is in each store location.

This map is updated every five seconds when the master computer polls the PLCs. The PLCs themselves identify the body types by the platens they are mounted on.

From this information and the paint shift schedules, the master computer is able to instruct the PLCs which platens to move to which location. Bodies are moved out of the store at a rate of one every 29 seconds; BL says this could not be achieved by manual means without introducing bottlenecks at other stages of the process.

After painting, the bodies are moved into another store, the painted body store, which like the unpainted panel store has one store control computer, a twin

DEC PDP-11/34, and five crane control computers, Data General Nova 3s. Bodies are moved out of this store into the assembly building under control of the master computer acting on information received from the 11/34s.

The sequencing of the movement of particular bodies is performed according to a complex set of requirements by an interactive procedure which continues until the optimum decision is arrived at. One build decision is taken on average every 42 seconds.

Other PDP 11/34 systems handle quality monitoring in connection with the Redditch centre, matching finished vehicles to customer orders, and reporting on production achievement.

In addition, a Ferranti Argus controls an automated vehicle electrical testing system - the one British computer used. The reason for this is that the system is not new, but was developed some years ago for Jaguar cars.



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The DP task that is closest to the end user

MOST of the advances in system development methodologies have been made on the side of the programming effort. But although programming errors are the direct cause of costly and inflexible systems, many of the errors can be traced back to errors in the analysis and design stages.

What is fundamentally wrong with many approaches is that no method exists for analysing and describing the business, its data and how it operates, divorced from any considerations of how the system will eventually be designed in a compact, user-oriented way.

It should be possible to analyse a business without any need to know which parts of the business may be computerised and which business functions will form the basis of computer systems. Indeed, it is impossible to perform an effective cost/benefit analysis of the computerisation of a business unless the business is fully understood.

Communication

In many approaches, the emphasis is placed on determining and analysing the "output required" (ie listings, reports, computer files, etc - a dangerous practice in itself as information requirements are never static) and then expressing the results in terms of computer files, English narrative descriptions (often long and complex) of the "processes required", and technical flowcharts of the flow of data through the system.

There is, therefore, an immediate need for an intermediate, compact "communication" tool, in order to verify with the user that the analyst has correctly interpreted what the business does and what it is interested in, in terms of the user's requirements.

The results of this approach are apparent - inflexible systems which are not resilient to change and whose development is often unco-ordinated and fraught with problems. The

A great deal of space is devoted in computer publications to technical issues - new hardware, new software, new programming techniques and so on. The only reason the new hardware and software are produced or the programming techniques are developed, however, is because a user, somewhere, somehow, wants a computer system. The DP task closest to the end user is analysis, and in this series Ian

Section I Part 1

Palmer and Rosemary Rock-Evans describe Data Analysis, a method developed by the consultancy CACI.



Ian Palmer



Rosemary Rock-Evans

IAN PALMER is technical director of CACI. He produced the first book on database and has served on the Codasyl Data Description Language Committee for many years. He has been primarily responsible for the development of CACI's System Development methodology, and for the practical application of the techniques described in this series.

ROSEMARY ROCK-EVANS is a CACI consultant specialising in data analysis and database, and at present is working on exchange control in the National Bank of Belgium. In her previous position with British Steel she was responsible for the development of the BS Data Dictionary.

trois, in preparation for designing the logical database (the database when implemented using the DBMS).

Neglected

The data analysis methodology is centred on two fundamental principles. First, analysis

must be undertaken of the business separately from any considerations of the technology which may eventually be used to implement the system. As has previously been shown, without a rigid distinction between analysis of the business and design of the system it is impossible to insulate the end user from changes in the technology supporting his system. Conversely, it is difficult to design a system flexible enough to respond readily to changes in the user environment.

This series is primarily concerned with business analysis, which is typically neglected compared with the effort devoted to technical design. Secondly, to design systems intended to share data independently of the various applications which may use it. This avoids the trap of designing application dedicated files, tied to the specific problem the system is oriented towards solving.

Top down

Thus the analyst is forced to take the wider view with regard to the data and how the area under study fits into the overall business.

The analyst is not constrained by concentration on output requirements as in the conventional approaches, but considers the business data and its functions as a whole. Data analysis is

The 27 parts of the series will appear as two separate sections. Analysis is a sadly neglected area. Present methods tend to concentrate on the functional aspects of systems, and ignore the data aspect. Data analysis is a methodology which links the analysis of functions and data together into an integrated, disciplined, structured approach involving the end user. This series explains the basics of the approach.

this a "top down" approach. Only later, when the relevant part of the business is fully understood, should the computer system design be developed. An assessment is then made of which business tasks could best be supported by computer systems and which tasks are better treated as manual procedures. For example, some tasks may be completed very infrequently and require excessive effort to translate into computer procedures, and these will be kept as manual tasks. The next step is to make a study on how the data is used and consequently how it can best be represented, given the restrictions of the DBMS, or file handling software.

In parallel

There are two main activities within the methodology: functional analysis and entity analysis.

Functional analysis is used to define the functions which make the business operate, for example handling orders, maintaining plant, controlling borrowing, paying staff.

Entity analysis is concerned with finding out what the business needs in order to operate, expressed in terms of the types of things it needs and the relevant facts about these things, for example, it may need people, plant, orders and accounts and it may need to know the date of birth, sex, and name of each person.

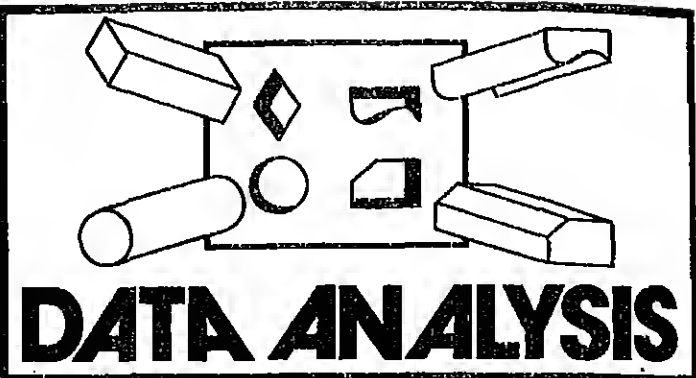
These two activities, functional analysis and entity analysis, are normally completed in parallel as complementary operations, each providing the other with better insight into the business.

Phases

Since details of both the data and its processing are essential to the design of an effective database, both activities are always used in preparation for database design.

Where the methodology is being used for other purposes, however, only one of the two may be necessary. The conversion of a system, for instance, depends very much on the structure of the data. When converting from one data structure to another - for example, from conventional files to database - both the source, data structure and the target data structure can usefully be compared using the results of entity analysis alone.

In Figure 1 the phases in data analysis are shown as part of the tasks involved in the design of a system. Although its main use is in implementing large and complex database systems, data an-



by Ian Palmer and Rosemary Rock-Evans

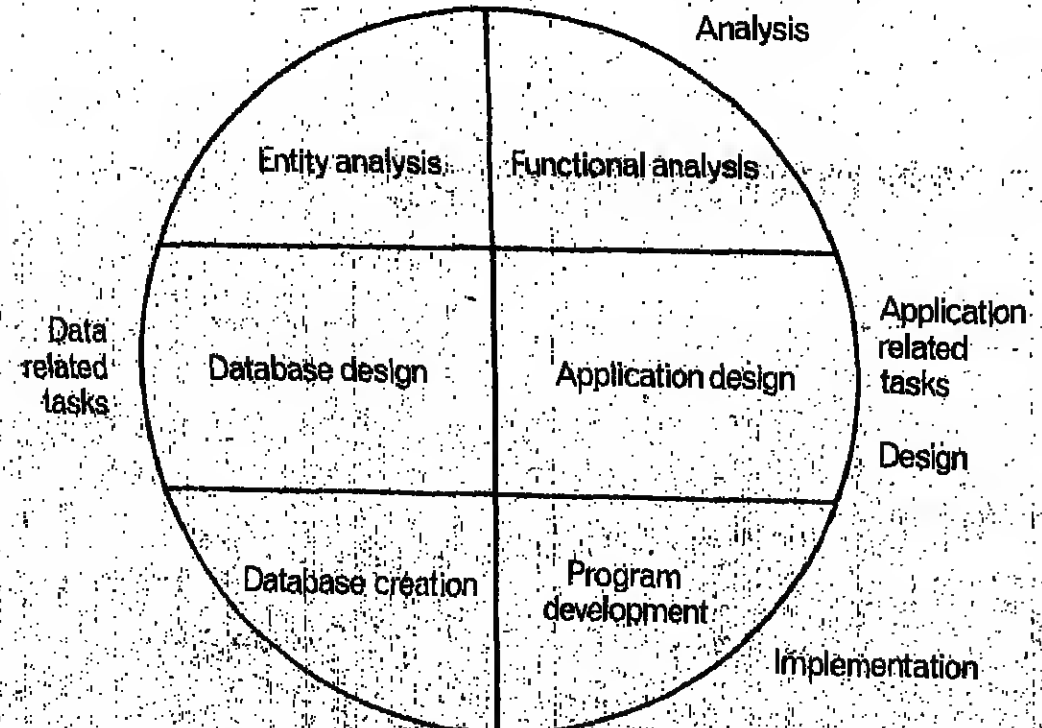


Figure 1. Data analysis as part of system design.

American Telephone and Telegraph Company has set the stage for the formation of an unregulated subsidiary which could be an "awesome competitor" in the DP market within three to five years. AT&T has about a million people on its payroll, and serves about 80% of the telephones in the US through its subsidiaries. Here PETER

KRASS describes the manoeuvres which are setting the scene for this giant company's foray into the data processing and communications marketplace.

AT&T reorganises to enter the DP market

THE world's largest corporation, the American Telephone and Telegraph Company, AT&T has now approved the reorganisation of its headquarters and chief personnel, setting the stage for the formation of an unregulated AT&T subsidiary.

The move, which took effect last month, includes reorganising responsibilities for some top officers, the corporation's acquisition of \$1 billion worth of stock in four subsidiaries, the consolidation of Bell operating company pension funds, and the pulling together of AT&T's foreign business operations.

AT&T is big: it employs about a million people, has annual revenues of over \$45 billion and serves about 80 per cent of the telephones in the US (through its subsidiaries). AT&T's wholly-owned manufacturing division, Western Electric, alone had sales

and separate it off.

Industry consultants the Yankee Group, headquartered in Cambridge, Massachusetts, are telling their clients that given a three-to-five year development time, the new unregulated subsidiary will be an "awesome competitor."

Some reshuffling of key executives is first among the moves aimed at forming the new unregulated subsidiary.

Robert E. Sageman, former executive president of AT&T's Long Lines, is now president and chief executive officer of AT&T International, a consolidation of AT&T's business outside the US.

James E. Olson, vice-president of the AT&T board, is now responsible for all the company's de-regulated operations. Reporting to Olson are Thomas E. Bolger, corporate executive vice-president and director of marketing and services activities. Hugel, also an executive vice-president, will direct residence marketing and services, as well as public services activities.

William M. Ellinghaus, AT&T's president, now has the responsibility of all corporate departments remaining regulated. Reporting to him now are Richard R. Hough, executive vice-president of networks, Kenneth J. Whalen, executive vice-president of regulatory and staff activities, and William G. Sharwell, vice-president of corporate planning and staff vice-president.

The second part of AT&T's re-organising is its acquisition through merger transactions, of the outstanding common stock it did not own in four of its telephone subsidiaries. The four are the Mountain States Telephone and Telegraph Company, New England Telephone and Telegraph Company, Pacific Northwest Bell Telephone Company and the Pacific Telephone and Telegraph Company. Also acquired were publicly held non-redeemable six per cent cumulative preferred Pacific Telephone shares.

Based on current market values, the combined worth of the mergers is about \$1 billion.

Prior to the deals, AT&T held about 89 per cent of Mountain State's stock, some 86 per cent of

AT&T is saying to IBM: 'You're not coming on our turf without us coming on yours.' And they say: 'You ain't seen nothing yet, from either of them.'

New England's shares, about 89 per cent of Pacific Northwest's stock, some 90 per cent of Pacific Telephone's common stock and 78 per cent of its preferred stock.

The third movement of AT&T's shift is the transfer of Bell Company pension funds and plans. AT&T will consolidate the 33 separate Bell system funds and plans just two, one for management and one for employees. Total assets of these pension funds and plans are currently estimated at about \$28 billion.

The fourth part of AT&T's move is the establishment of AT&T International. This new company will consolidate Bell System interests outside the US formerly the responsibilities of Western Electric International and American Bell International.

In all, the four moves involve quite a bit of activity. But an AT&T spokesman says, "These are just the first steps. The future of our business is becoming clearer. We are now setting the

stage for restructuring. But there's still a lot of work to be done: we're going to be a far different company than we are now. But it will be an evolutionary process."

As AT&T shifts, others in the communications business are getting ready. "We're not to wait and see," says GTE TeleNet spokesman, "I think we all overreacted to the move, at least at first. All AT&T has done is to shift people to deal with how they will form the new unregulated subsidiary. AT&T has to do surgery on itself - and that will take time."

Everyone agrees with the last observation. The FCC says the change can take about two years, and has set a deadline for AT&T of March 1982. By that date, the FCC says, AT&T must have itself ready for unregulated business.

But company officials say that is not long enough.

Kenneth Bosworth, president of market research group International Resource Development Inc., believes "all AT&T wants is to settle the matter by the deadline. Or, to roll the dice back, hopefully by 1981."

Bradford J. Peery, telecommunications stock analyst for Paine Webber Mitchell Hutchins, says AT&T's biggest problem will be figuring the value of its assets. "The company's depreciation time for capital equipment is not short enough. So AT&T assets are overvalued on the books."

Peery adds that AT&T's unregulated future will probably include sales of custom equipment, development of new store and forward services (which, he says, will



ROBERT E. SAGEMAN (left), former executive president of AT&T's Long Lines, is now president and chief executive officer of AT&T International, a consolidation of AT&T's business outside the US.

One such analyst, H. Donald Haback, of consultants Partner Group, says that ACS, while probably still two years down the road, will be part of AT&T's attempt to control all electronic office communications.

In July, Haback told his clients, "AT&T intends to compete head-on to maintain its leadership role." And he now says that the company's realignment is part of the realisation that it would have to compete directly with IBM and the rest of the data processing world.

"It will be interesting to watch IBM and AT&T. IBM will soon go into the private branch exchange (PBX) business in the US with its Satellite Business Systems. But AT&T is saying to IBM: 'You're not coming on our turf without us coming on yours.' And I say, 'You must see nothing yet, from either of them.'"

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INDUSTRIAL DEVELOPMENT

There are now many fast-growing new towns in the UK, offering opportunities to expanding companies from the UK and abroad. Here John McEachran, Information Officer with Livingston Development Corp, describes the facilities which attracted the Japanese company Nippon Electric to open an LSI manufacturing plant in the town; Will

Summers, public relations officer with Telford Development Corp, gives an overview of this West Midlands town; and Ron Knox, product manager with the chief estates office of Warrington New Town, describes Birchwood Science Park, an estate designed specifically for scientific and high technology enterprises.

Why NEC likes Livingston

by John McEachran

THE decision by the Nippon Electric Company to establish its new manufacturing facility in Livingston is a major boost for the electronics industry in East Central Scotland, which is already one of Britain's major locations in this high technology field.

The new Livingston plant, which will represent an investment totalling £40 million by the company and create up to 800 jobs by 1985, will be the first fully-integrated IC facility run by a Japanese Company in Europe.

The new factory will be built at Deans Industrial Estate, which straddles the M8 motorway. It is scheduled to be in operation by April, 1982, starting with assembly of large-scale integrated circuits and proceeding to wafer fabrication by early 1984.

The company has tentatively named the new plant NEC Semiconductors UK. It will be

NEC's second manufacturing plant in Europe. The first was established in 1974 in Ireland. The Livingston plant will produce advanced LSI devices such as 64K memory chips and 16-bit microprocessors. Production capacity will be 3 million units a month.

Looking to increase its share of a growing European market for integrated circuits, NEC carried out a careful investigation and study of various locations for a new manufacturing facility. They finally selected Livingston for the following reasons:

"Livingston is a new town, and the government and the local development corporation have put strong efforts into its development. As a result, environmental factors, such as water supply, sewer system, transportation, communication system, housing, educational and medical institutes and shopping places are well established.

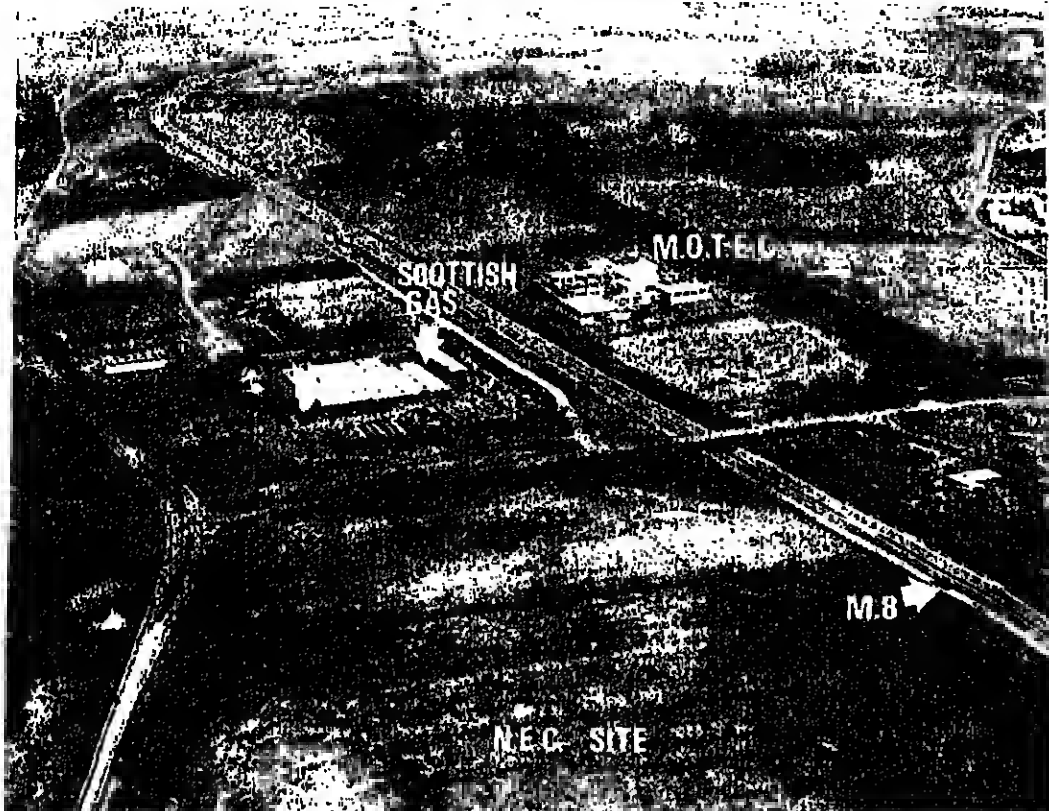
"More than 150 firms are already doing business in Livingston, therefore, basic industries to support the production of ICs - such as electrical power and gas supply, chemical and precision machine processing industry, are already in place.

Aggressive

"The British Government has shown an aggressive promotional effort towards NEC's establishment of its second European plant in Scotland, and has offered the maximum financial support.

"Edinburgh, a neighbour city, has an international airport.

"The universities and technical institutions will provide the engineers and experts required for the project and in some cases will co-operate in studies on the research and development of NEC's products.



Planned site of NEC Semiconductors UK. The town of Livingston can be seen at the top of the picture.

"The population of Livingston, now 40,000 is expected to reach 70,000 in the future, thus providing a ready supply of manpower."

To reciprocate the support NEC has received from the UK government, the company has agreed to put every effort into improving local employment prospects and supplying better services to its customers.

Impressed

William K. Geddes, chairman of Livingston Development Corporation said he was "highly delighted" when the company announced in September that it had decided on Livingston as the location for its new European plant.

"We as a corporation were very impressed by the thorough examination which the Nippon Electric Company made, not only of the site, but of the other facilities of the town as well.

"They asked searching questions and looked closely at all the facilities, including housing, shopping and education, which appeared to concern them just as much."

Geddes added that it was a major decision for the town and he was delighted that in combination with the government and other agencies Livingston had been able to attract such a major company to the world electronics field.

Livingston, a special development area, has proved to be one of the most attractive locations for electronics companies. NEC will join such names as Burroughs, MFB Corp, Ferranti and Scintag Berthold which all have manufacturing facilities in the town.

The great majority of new companies moving into the town to both the industrial and commercial spheres originate from outside Scotland, attracted by Livingston's attractive environment, and its links with airports, container ports, railheads and motorways.

Building

Burroughs is building a factory on a five and a half hectares site, where it will manufacture data processing equipment for the banking industry.

On a nearby site, MFB Corp moved this year into its first manufacturing plant outside North America, which will produce peripherals, including floppy disc drives.

Ferranti announced early in the year that it had chosen Brucefield Industrial Park as the location for its computer graphics design facility, which it intended to move from Edinburgh. And a new company, Scientific and Electronic Enterprises which is looking for innovative ideas in the electronics field to develop into marketable products, chose Brucefield as the location for its development.

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A REVIEW OF DEVELOPMENT OPPORTUNITIES IN THE UK

Industrial Revolution's birthplace

by Will Summers

TELFORD is a new town built to serve in particular the expansion needs of the West Midlands from north of Stoke-on-Trent to South Worcestershire and across to the Welsh border.

It is one of the largest urban areas in the West Midlands, embracing the old market town of Wellington and the adjoining townships of Oakengates, Dawley, Madeley and Ironbridge, and covering 30 square miles of East Shropshire.

Telford is only 19 miles from Wolverhampton, some 30 miles west of Birmingham and ten miles from the county town of Shrewsbury, and is in the administrative areas of The Wrekin District Council and Shropshire County Council.

The town stretches from the edge of the North Shropshire Plain down to the deep, tree-lined and historic Severn Gorge. To the west is some of Britain's loveliest countryside which is the gateway to Wales and the Marches and the much sought-after mountain and beach resorts of mid and south-west Wales.

Overspill

In 1963, with a target population of 90,000, Dawley new town was set up not only to provide for the overspill population of Birmingham, but also to help revive the local economy.

By 1968 it was apparent that a larger task needed to be fulfilled and Telford was then designated, more than doubling the area for development.

The target population is now

130,000 by 1986 through induced growth, rising naturally in the following ten years to 150,000. The infrastructure exists for a further increase to 200,000 in the next century if the need arises.

In the Severn Gorge stands the world's first iron bridge, designed by Thomas Farnolls Pritchard and made by Abraham Darby III in his Coalbrookdale forge (1779). At Coalbrookdale in 1709, Abraham Darby I sparked off the Industrial Revolution by discovering how to smelt iron ore with coke instead of charcoal, and made possible the manufacture in the Telford area of the first iron boat, the first iron railway lines, the first iron aqueduct and the first steam locomotive to run on rails.

New Jobs

The commercial heart of the town is Telford Centre. The first phase, opened in 1973, comprises a 100,000 sq ft Carrefour hypermarket (the first in Britain to be given planning approval), a 50,000 sq ft Sainsbury's superstore and 23 other units.

The second phase, due to begin trading in 1981, will more than double the air-conditioned, covered shopping mall with its three major stores and 31 other units, bringing over 1,000 new jobs to add to the 1,500 already provided in the first phase. Tenants will include Debenhams, Mothercare and other high street retailers.

District shopping facilities have been improved at Wellington, Dawley, Oakengates and Madeley, and new centres established at

Stitchley and Hadley. Each new housing area has its own shop-on-the-corner facilities.

Apart from the Telford Centre development, the Corporation has built seven supermarkets and 51 other shops.

There are three golf clubs around the town complementing the Corporation's first within it, Great Hay, which is the centre of a new £2 million leisure complex funded by institutional finance. The Great Hay course, over 7,000 yards long, is built to championship standards.

Sports, play and community centres are throughout the town. There are also recreation centres, some with their own swimming pool, squash courts, golf driving range, dry ski slope, etc.

Sports clubs

There is a professional football club, Telford United, whose managers have included the famous World Cup players, Geoff Hurst,

and now Gordon Banks, and a host of amateur hockey, rugby union, soccer, cricket and athletic clubs.

New lakes and the River Severn provide for canoeing, yachting, boating and angling enthusiasts.

So far, £160 million has been hurrowed from the Treasury to carry out the development, with private enterprise investing more than double that amount in industry, commerce, offices and housing. More and more private funding is taking over from the

Treasury as the town grows.

In the 80s the Corporation has to change the complexion of the town to enhance its prestige regionally and nationally as a higher status service centre. This will be brought about through the growth of Telford Centre, the building of the A54 (due to start early in 1981), the new central railway station, the general hospital, better further and technical education, improved training for industrial, commercial and management skills and more local accommodation.

by
Ron Knox

Designed for science

BIRCHWOOD Science Park was launched in 1974 by Warrington New Town Development Corporation as a direct result of the identifying of the growth potential within the science and technology field and having all the benefits which contributed to the success of the original American model.

The area is designed exclusively for science-based and high technology enterprises. The decision to create Birchwood was based upon the findings of independent research, together with the evidence of the general industrial mix and support services available in the area that could complement developments of this nature.

Close university links, an attractive physical environment, proximity to other firms that are in the vanguard of ideas, pool of skilled labour, good communications particularly by road and air - Birchwood has all these attributes in abundance.

The Warrington area has always been a major centre for high technology industry. The

UKAEA/BNFL/NPC complex at Birchwood is one of the major centres of the British nuclear industry and at present employs about 4,500 people; British Nuclear Fuels Ltd occupies Rutherford House and Fleming Nuclear Physics Laboratory, which employs about 500 people.

Ideal

Another important tenant is Data General, which has located its European Training Centre for field engineers at Birchwood; building is currently under way for Digital Equipment, the world's largest manufacturer of minicomputer systems. Others include Carborundum, Engineering Polymers, Instrumentation Laboratory and Mateval NDT.

There are other significant examples of scientific organisations choosing to locate in the area. The Joint Universities Research Reactor is funded by Liverpool and Manchester Universities, which saw Birchwood as an ideal

half-way location. The National Centre for Tribology and the European Space Tribology Centre are also located within the Birchwood area. To the south-west of the town is the Science Research Council site, funded by Daresbury Nuclear Physics Laboratory, which employs about 500 people.

Birchwood Science Park was awarded an AIPR environmental and ecological award in 1979 - the first time that such an award has been given outside North America.

Within Birchwood Science Park lies an opportunity for all new, emergent or expanding companies. It is a building called Genesis. Genesis has been specially erected to cater for the needs of small to medium-sized high technology companies. Technology by its nature is dynamic and a building specially designed to cope with the needs of technology must reflect this dynamism.

Genesis has, therefore, been de-

signed with total flexibility in mind. Firstly there is flexibility of size. You can tailor any unit ranging in size from 375 sq ft up to a maximum of 5,000 sq ft and can have exactly the size you need, not paying for wasteful space.

Potential

Secondly there is flexibility in specification in terms of services and facilities. We can provide the right facilities for the specialist requirements of high technology industries and in particular the computer industry. Indeed, many of the first tenants of the Genesis building have come from the computer industry.

So, how would you fancy working in a modern building overlooking a beautiful parkland environment, with your car parked outside the door and direct access straight from the motorway? Genesis can provide all this in a catchment area of vast high technology potential.

When Rolls-Royce Motors need electronics they come to Telford.

Robert Turnbull, Marianne Haste and Reg Head (Managing Director), from Avant Electronics, Telford.



Sophisticated electronic control equipment for the best car in the world comes from one of Telford's fast-growing companies. Avant Electronics, situated on Halesfield 22, picked Telford in 1969, because their thinking, like their products, is at the forefront of the market.

Telford, growth point of the West Midlands, has the space and skilled workforce needed by industry, yet is also set in unspoiled Shropshire countryside. As an established community, Telford has the environment and choice of housing to make it an attractive place to live and work.

So, if your drive is for growth, talk to the Telford team.

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THE WORD PROCESSING SCENE

How the WP revolution affects US office workers

IBM's so-called "office of the future" has already made its debut in the United States; a major role has been played by word processing. Sales of word processors are having a nice effect on the pockets of some vendors, as well as on the productivity of some offices.

According to Quantum Science Corp., a New York research group, \$1.4 billion worth of word processing equipment was shipped in the US last year, some 170,000 machines. By 1984, Quantum forecasts, annual word processing shipments in the US will be up to 750,000 units, worth some \$4 billion.

But what effect is the appearance and subsequent proliferation of these machines having on American office workers?

Most US word processor vendors have simplified the operation of their products in recent years. Today's word processing machines are much easier to use than their predecessors of only five years ago. And this means that today's word processing operators need not be as skilled as their recent predecessors.

In addition, easier-to-use machines require less operator training. In some cases, training is limited to self-instruction literature provided with the equipment; this is how IBM will support its Displaywriter.

IBM calls the Displaywriter instructions "self-paced literature." That is, the user will learn how to operate the machine at his or her own speed. The company says that most people can learn complete operation of the Displaywriter in about five days.

According to a spokesperson from IBM's Office Products Division, which is marketing the machine, "The Displaywriter will be easy to learn, so we won't provide any stand-up training." In addition, he says, the company

will supply users with a toll-free telephone number which they can call for assistance with Displaywriter problems.

One of America's largest vendors of standalone word processors, Lanier Business Products, provides its customers with operator training for one or two employees for up to three days. This training is included in the cost of Lanier's machines.

Reg Parker, Lanier's director of training, says, "Our task is to induce people to use the equipment after it has been bought. The users, mostly secretaries, are asking themselves, 'Is this machine here



The IBM Displaywriter system is supplied with "self-paced" literature, which enables the user to learn to operate the system at his or her own speed — about five days for most people, says IBM.

to replace me, or to help me? Unless this dilemma is resolved, it's hard to get going."

Simple

Parker adds that training users is part of the sale for Lanier. "Two people are involved," he explains. "The decision-maker, who has the money and the authority to buy the machine, and the actual user. Sales are aimed at the decision-maker. But training cuts to the user. This, in turn, pleases the decision-maker. Our philosophy is quite simple: training is part of the product."

Beyond this initial training, Lanier offers two additional service plans. The first is called the extended support guarantee. It is contracted one year at a time, and costs \$144 per word processing unit. The plan includes training for specialised applications and continued service.

The other plan, called interim support service, costs the user \$35 an hour. It is used by offices with relatively simple applications, those that need Lanier's assistance only occasionally.

Why are these additional service plans needed? Lanier's Parker says that as many companies add new word processing machines and applications over time, they find that they need Lanier's additional instruction and advice.

Wang Laboratories, another large American vendor of word processors, gives its customers tape-recorded, self-paced instruction programs. The company has several regional centres, staffed by its own instructors, to which Wang users send their personnel for training.

According to Dale Kutnick, of industry consultants The Yankee Group, economy is the root of to-

day's easier-to-use machines. "Word processing users want lower prices, so the vendors have to cut prices," Kutnick explains. "So, away goes most training. The vendors are unhanding everything, including instruction. And the newer equipment is easier to use, so a lot of training is unnecessary."

Ergonomics

As competition in the US word processing arena tightens, vendors are continually looking for new ways to get ahead of each other. Some have found that attention to ergonomics is paying off. Ergonomics is the science of applying biological and engineering knowledge to the problems of people using machines. Some vendors call this "human factors." It can be as simple as designing a video display screen that can be tilted to suit the operator's height, or as complex as controlling radiation leakage from the screen.

Some industry consultants have recently applauded IBM's work in this area, particularly on the design of the Displaywriter. The company has built a system, they say, that is pleasant and easy to use.

But vendors' attention to ergonomics is, at best, spotty. According to Brett Martensen, vice-president of technology for Canadian consultants Technetronic Inc., "You need the right chair, the right keyboard, the right lighting. Some companies are quite good at this; others are not so good."

But no matter how well-designed equipment may be, some word processors may be hazardous to users' mental and physical



"I didn't get where I am today by not knowing about word processing," CJ's secretary is operating the Canon-built AES Plus, sold by Lanier in the US as the "No Problem" word processor.

'Smaller groups of better employees'

health. Working at a word processor equipped with a VDU is stressful, says Karen Nussbaum, executive director of Working Women, an American association of office workers. The closest thing to an officer workers' union (without actually being one), Working Women has affiliate groups in 12 American cities.

"The machine, not the operator, sets the pace of work," Nussbaum explains. "And this causes stress. Some screens give off a lot of glare, or have poor resolution. This can cause hypertension, nausea, eye and back strain. So, we say that people should not have to work at VDUs for a long time. It's unrealistic."

But some industry experts say that claims of dangerous automation are groundless. Amy Wohl, president of industry consultants Advanced Office Products, says that today there is no such evidence, and that there probably will not be any soon.

Boredom

"In 30 years of government testing, there's been no proof of cancer or eye damage from video display screens," she said. "If it hasn't turned up yet, well... I guess it is useful that people worry about these things. I don't think anyone will ever find any health hazards, and this would be reassuring."

On a less dramatic note, Working Women's Nussbaum says that working at word processors is dull. It may not constitute a major health hazard, she says, but it does lessen workers' job satisfaction.

But according to Technetronic's Martensen, clerical boredom may be inescapable. "One result of high technology is boredom," he says. "Word processing is very dull once the operation is learned. Other industry watchers have raised some weighty questions about the social impact of word processors and other office automation. One such thinker is Philip Kraft, a sociologist with the State University of New York, in Binghamton, New York.

Polarisation

According to Kraft, "the introduction of word processors is an attempt to industrialise white collar workers in the same way we industrialised craftsmen and artisans in the past. It's the continuation of an old struggle. The idea is to replace skilled people with unskilled people."

Kraft believes that office automation will polarise the workplace. On one hand will be a relatively small group of designers, technicians and programmers, the "smart" people. On the other will be a larger group of machine tenders. "Stupid workers and smart machines are the goal for every manager in the workplace," Kraft explains.

The New York scholar adds that management control and cost cutting are the goals of users of the new word processing equipment.

"Everything else the vendors say is hype," he says. "Control and cost are the reverse sides of the same coin. And the microprocessor is making this both obvious and widespread."

Trouble

Kraft insists that automation itself is neither bad nor good. It's how it is used that matters, he says. And today, Kraft adds, it is being used as part of a shift. "There is a transfer of control

from the worker to the manager," he explains. "These machines are not programmed by those that use them. They're loyal to management."

Philip Dorn, a New York-based office automation consultant and the author of several articles on the subject, is also concerned with some of word processing's hettier problems. Like Kraft, he believes that office automation is polarising society. But unlike the sociologist, Dorn maintains that automation will push those on the bottom of society out of work. "If we fully automate everything, we're in big trouble," he says.

"The office workers that remain after word processors are installed must be smarter, not less intelligent. We'll see smaller groups of better workers — the ones that remain must make decisions. But it's depressing when you think of what happens to those at the bottom — those with low skills and little education. If automation pushes enough people out, the next thing you get is a revolution."

Dorn says that the American government should address the issues of office automation. But, he says, it does not care to. "Here in the US, the slant within the government is toward management. In some of the socialist European countries, there is a genuine concern for workers."

But Dorn points out that solutions to these problems are not easy. "A solution like a no-lay-off policy, for example, sounds nice. It creates work. But it also runs prices up, resulting in zero exports. There do not seem to be any real solutions. But I know there is a problem."

Negative effect

On exception to the office automation dilemma, Dorn says, is the American law firm. All lawyers, he explains, insist on having their own secretary. They are not going to trade a person for a machine. Rather they equip their secretaries with some high technology machinery, typically a word processor. In this way, productivity goes up without destroying jobs.

In many cases, use of word processors specialises work. And according to Working Women executive Nussbaum, this has a negative effect on office workers' psyche and self-satisfaction. "Although many people like the new machines when they make work easier or more enjoyable, in some cases, the rewards of clerical work are eliminated," she says.

"Work is being broken into more specialised jobs that are often boring and highly repetitive. And the rewards, pride in a job well done, meeting other people in the company, following through on a task from beginning to end, are removed. We'd like to see jobs that maintain variety."

Shortage

One result of the new office technology is a current shortage of qualified word processing operators. In fact, consultant Wohl says, there is a shortage of good secretaries in general. And as a result, salaries for word processing operators can be 75% to 100% higher than those for clerical workers.

In addition, Wohl predicts, freelance word processing operating and training will become a major industry. In several large cities, there is already a sizeable market for freelance word processor operators. According to Vincent Gordon, of New York's Arvis-on-Park employment agency, it is "definitely hard to find competent word processing operators. We've got lots of jobs for them."

"Learning word processing is a matter of attitude," Gordon says. "It's a computer. But from an operator's point of view, the machines today are simple. It is a state of mind. You have the people who want to go with the flow."

"These days, it's easy to get a job as a freelance word processing operator, even if you don't have a lot of experience," Gordon adds. Starting salaries for operators, who have at least 1,000 hours of experience, are between \$275 and \$325 per week, depending on experience and shift worked.

Another result of the word processing operator shortage is the emergence of word processing services. One such company, Rooney Administrative Services, also in New York, does overflow work for low firms as well as for small companies that do not own word processing equipment.



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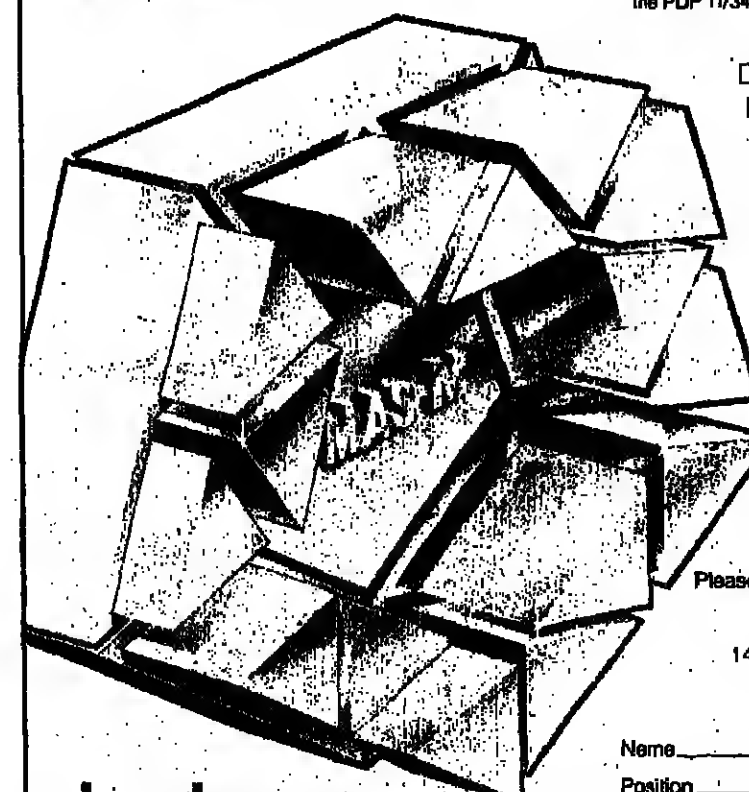
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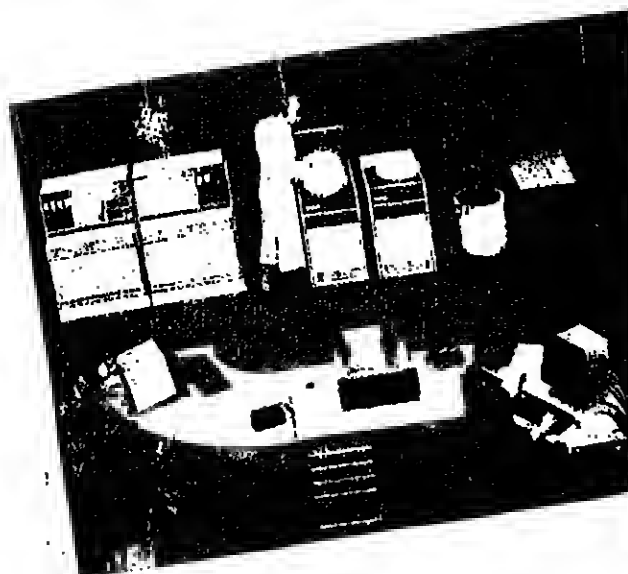
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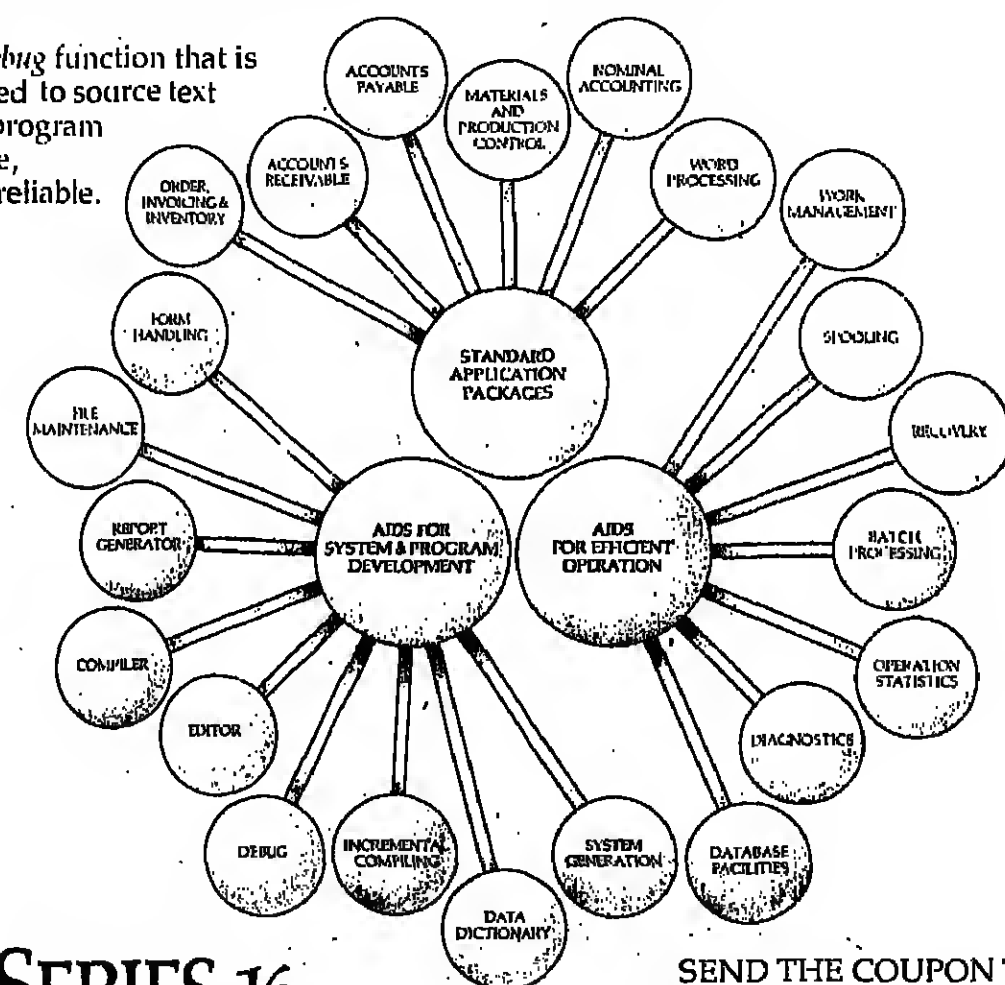
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Assistant Editorial Manager
Time Press
Box 1000
London W1A 1AA
Tel: 01-462 10120
01-263 10017
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opportunity to join an expanding group which provides challenge, recognition and real opportunity for personal development.

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If you are one of the professionals we seek, please reply to any of our offices, with your career resume. Alternatively, write or telephone for an application form.

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Without sophisticated and highly reliable software, modern avionics systems, based as they are on firmware technology and digital signal processing techniques, could be neither designed nor operated.

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In this, our Airborne Software Division plays a crucial role. It is also responsible for much of the training in software techniques and programming which is needed in a company such as ours.

The Division now seeks an additional Software Lecturer to provide courses in programming techniques and microprocessor applications for our software engineers and other specialists.

Part of a small team based at Borehamwood, the man or woman we appoint will be involved in all aspects of

our training courses, from the writing of syllabuses to the delivery of lectures.

Considerable practical knowledge of programming, preferably gained within an industrial environment, is prerequisite, and previous experience of teaching or lecturing would be an advantage.

As a member of staff in Europe's major avionics company, the person appointed to this position may expect a highly competitive salary and other benefits commensurate with the seniority of this post. There will include relocation expenses where appropriate and, under certain circumstances, assistance with local authority housing.

For further details, please telephone, or write to Chris Hill, Marconi Avionics Ltd., Elstree Way, Borehamwood, Herts. Tel: 01-953 2030 ext. 3449. Alternatively telephone 01-207 3455 anytime. Please quote reference MAB0143.

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System Industries

Our client, SYSTEM INDUSTRIES, is a public Californian corporation active in the minicomputer peripherals business with its European Headquarters in Woking, Surrey — and offices in Germany and Scandinavia. As a direct result of continuing high growth, additional personnel are required to support the demands of an ever increasing customer base. The company offers generous benefits including private medical insurance.

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up to £10,000 + car + profit share bonus Working

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TECHNICAL SUPPORT ENGINEERS are needed to join a small team of specialists dedicated to providing in-depth support to both customers and System Industries own engineering and marketing departments. Computer and drive experience should be as above.

Repair Technicians

up to £7500 + profit share bonus Working

TECHNICIANS are required, for the company's repair centre, with a good grounding in digital and analogue techniques. Knowledge of disk drives would be an advantage but not essential.

Applicants for any of the above positions should telephone David May, at Peterson Davidson, who will arrange for suitably experienced people to meet System Industries at an early date.

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Candidates for the Systems Manager vacancy will probably possess around five years' D.P. experience including some programming background, ideally on ICL hardware. It would suit a young, enthusiastic senior analyst/project leader ready to move into the No. 2 slot.

The Senior Analyst should have three years' experience, preferably including time spent as a commercial programmer. ICL knowledge would be useful but not mandatory.

For further details contact JACK COLLINGS on 0273 833848 (9am-5pm) or 0273 400880 (after 6.30pm) any evening including weekends. Local interviews can usually be arranged. Ref: CW/48/80

(2951)

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(2951)

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ANALYST PROGRAMMER

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ICL 2800 UNIBYTE VME/B — 10MS/TF
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At least four years commercial programming experience is essential. Knowledge of 2800 and VME/B desirable and experience of micro or mini computer systems would be a bonus. Appropriate training will be given if necessary.

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For further information please contact Ian Currie on 01-580 4488. Ext. 7327 or write to: Microcomputer Applications Team (BBC) Ltd., 1453 CV and enclose a recent BBC Appointment Form (W1A 1AA Tel: 01-580 4488, Ext. 4819).

(2950)

UNIVERSITY OF SOUTHAMPTON

MICROPROCESSOR SERVICE

Applications are invited for two part-time appointments in the Computing Service to assist and develop a microprocessor and microcomputer development service to all Departments in the University. The service will, in particular, concentrate on Systems and Software aspects and will take place in close collaboration with the Department of Electronics to ensure a comprehensive service. Other related developments in the Computing Service include the introduction of a University wide digital communications system and the mechanisation of production processes. The salary scale for this appointment will be within a range from £5505-£11675 p.a. (starting salary will depend on qualifications and experience). Applications with a curriculum vitae and the name and address of three referees should be sent to Mrs P. Vaughan-Smith, Staffing Department, The University, Southampton SO8 5NH, from whom further particulars may be obtained. Please quote ref: 1152/A.

(2951)

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A PROGRAMMER/COMPUTING ASSISTANT

is needed for the MRC funded Epidemiological Monitoring Unit in the Department of Medical Statistics and Epidemiology to assist in research on environmental health problems.

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(2951)

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A major Financial Institution based in the City is seeking to recruit additional Financial Designers. Candidates must be self-motivated, personally presentable and have the ability to liaise with Users and Consultants at all levels. It is essential to have at least three years' Banking or Insurance experience and to be familiar with Foreign Exchange, Eurobonds, Premium Receipts or Portfolio Management/Investment.

Candidates who have worked within a multi-computer based distributed processing environment will be particularly favoured. As a member of a small project team comprising Systems/Business Analysts and Programmers you will be involved in the development and implementation of new systems for both the City Offices and its European counterparts. Ref: L/40/A

Real-Time Applications

Pennine Counties: Salary to £10K

A foremost Total Systems Supplier has an urgent requirement for Analyst/Programmers and Project Leaders to join either its Customer Support or Software Development teams. Analyst/Programmers should possess at least 2 years' Basic or Assembly programming experience gained on any leading mini or micro-computer. Additionally, successful

candidates will be expected to offer at least 12 months analysis of either technical or commercial systems. Project Leaders should have a similar background supplemented by actual or potential management abilities. Location is unlikely to be a limiting factor as the company is well served by road and rail facilities. Ref: L/40/B

Microprocessor Engineers

Switzerland: Salaries to £15K (equivalent)

Our client has a justifiably enviable reputation as a Semi-conductor Equipment Supplier. Its manufacturing and software development Headquarters is situated near Zurich. We have an exclusive assignment to recruit several Software Development Engineers to join the Company's permanent staff. Emphasis will be placed on technical achievement and in-depth industrial/practical experience. A Bachelor or Masters Degree in Electronics, Electrical Engineering or Computer Sciences is a desirable asset. Additionally, all candidates must offer a minimum of four years' microprocessor software development. There is preference for those fully familiar with Motorola 6800 hardware and software, although, of course, respondents will be considered who have had in-depth ex-

perience with Intel 8085/8, Zilog Z80/Z800 or Fairchild Systems Software. It is preferable for some German language ability for social/cultural reasons as much as for the working environment. Of prime importance is a real enthusiasm to relocate to Switzerland for a minimum period of 2 years. Every assistance will be given in relocation including the cost of removal of all personal effects and the provision of temporary accommodation until such time as you are settled in a permanent apartment. Our client offers an above-average salary together with an unrivalled range of ancillary fringe benefits. Initial screening interviews will take place in London after which short-listed candidates will spend one day at the Company's premises. Ref: L/40/C

Micro Support

Central London: Salaries to £8K + Car

Our client is a leading Micro Computer Manufacturer based in Central London. The rapid increase in sales of its Business Systems has created vacancies for additional Micro Support Engineers and Software Support Programmers to maintain and enhance its reputation for outstanding post-sales hardware and software support. As a Micro Service Engineer you will support the increasing customer base of microcomputer systems and terminal products. Full training will be given to suitable ambitious engineers with an in-depth

knowledge of Electronic Engineering and Microprocessor techniques. Software Support Programmers should offer at least one year's BASIC or PASCAL programming experience on any mini or microcomputer. In addition to a sound Software programming background, interest in Personal Computing will be a distinct advantage. For all positions, candidates must demonstrate the ability to liaise with customers and solve any problems which may arise both quickly and professionally. Ref: L/40/D

H. P. Scientific Programmers

Netherlands: Salary to £16K

Finley in FORTRAN, gained from continuous exposure to scientific applications for a minimum of 3 years. Is the prime requirement of our client. During this period, candidates will preferably have been exposed to Hewlett Packard 21MX, 1000/3000 series hardware in an on-line environment. Since the company is one of

the leading Continental Total Systems Suppliers, suitable applicants will currently be employed by a similarly successful company. Applications areas include graphics, signal processing, flight control path analysis. Those working for military or process control oriented companies will therefore be of particular interest. Ref: L/40/E

Process Control Programmers

Greater and Inner London: Salary to £10K

A leading supplier of Industrial Processing and Control Systems with London-based Headquarters and a Manchester regional office is seeking to recruit Programmers with one to five years' Programming and Systems experience. All applicants should offer at least one year's post-graduate programming experience in ASSEMBLER, PASCAL or BASIC, preferably in a real-time environment. Whilst this is not essential

for candidates to have a micro background, preference will be shown to those able to demonstrate involvement with Intel, Zilog, Motorola or Ferranti based systems. There is a possibility of a permanent or long-term assignment. Salaries offered will, naturally, reflect the experience and potential of applicants but will certainly be generous. Ref: L/40/F

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London — £7,000-£12,000

A number of clients urgently seek experienced Analysts and Programmers accustomed to building software in the Banking, Financial or Commercial sectors. A variety of positions exist enabling candidates to work on interesting systems including real-time, database and a wide variety of variable applications projects. Attractive large benefits exist, including low cost mortgage schemes and low cost bank loans. Telephone No. 0782-623665. Carol Attek.

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The EMS Group are seeking additional experienced Project Managers capable of effective men management and able to handle multiple projects to enable us to install an increasing number of turnkey systems during 1981. The company already has a significant base of on-line modularized software developed and the majority of tasks will involve building enhancements to pre-established systems and both planning and controlling system development to client installation for a wide variety of UK products. A sound systems design knowledge will be important as will the ability to undertake feasibility studies and prepare system specifications on client requirements throughout a wide range of industrial and commercial trading sectors. Sound business communication is important, as will be the ability to control staff and effectively motivate a team with sound leadership abilities. We seek candidates able to accept a degree of pressure working to tight deadlines in a number of systems volatile industries. We do not envisage candidates under 28 years of age having attained the relevant degree of manpower control experience. Salaries will be negotiable with the opportunity of acquiring a company car for relevant positions. Once candidates have proven their ability to perform satisfactorily at a Senior Project Managerial level, we seek Managers capable of promoting and maintaining effectively designed systems in a disciplined and well-documented environment which will need their personal control and responsibility. We offer an interesting and varied range of projects, good career development opportunities for key performers. Telephone No. 021-454 7905. Ian Gapper.

ANALYSTS

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EMS urgently require a significant number of experienced systems staff, preferably qualified to a minimum 'A' level standard. Candidates must have at least 5 years' total data processing experience with a minimum 3 years in the systems sector. Experience in working from initial feasibility study through to final implementation with at least 2 major projects will be sought. We have a number of large on-going projects in the merchandising and distribution sectors and require experienced Analysts capable of communicating effectively with the client and working with large project teams activities with a minimum of supervision. Excellent salaries and fringe benefits exist. Contact us urgently. Telephone No. 0782-623665. Colin Phillips.

ANALYST PROGRAMMERS AND PROGRAMMERS

Hampshire — Up to £8,000

Our clients are shortly to acquire a new Honeywell DPS4 model and require 2 additional Programmers with a minimum of 3 years' Cobol experience to start working on a variety of commercial control systems. Any experience of ID52 and Honeywell Series 80 would be a significant advantage. In addition, the Analyst Programmer should have extensive experience in analysis and design of TP systems. The work will involve full development of major commercial processing and administrative routines which are at present deployed on 2 mini computers. Database techniques will be extensively used. There will be a considerable amount of overtime working for at least the next 3 years during the introduction of the new computer. Overtime is paid for at 1 1/2 times the basic hourly rate. Telephone No. 0782-623665. Carol Attek.

SYSTEMS PROGRAMMER

Wiltshire — Up to £8,000

A large industrial group with an IBM 3031 are planning to change the system over from OS to MVS and to add further memory to the existing hardware. In addition, they will be taking a 4.6 megabyte machine over the next year. We urgently seek an experienced Systems Programmer with sound MVS knowledge of a minimum 2 years' and also good knowledge of VTAM. A wide variety of interesting projects exist and a sound career opportunity is available for relatively experienced candidates. Relocation expenses will be paid where applicable. Telephone No. 0782-623665. Carol Attek.

ANALYST PROGRAMMER — MIDDLESEX

To £8,500

A large industrial group using an IBM 4300 Series machine require additional experienced Cobol Analyst Programmer able to work on batch systems developing project cost control applications in the area of normal ledger, materials control and payroll. All candidates should have a minimum 3 years' Cobol in an IBM mainframe environment. The system runs under DOS/VSE. Telephone No. 0782-623665. Carol Attek.

COMPUTER OPERATIONS SUPERVISOR

Mid Glamorgan — c. £8,500

Our clients are seeking a candidate with a minimum 8 years' Operations experience of ICL machines. The particular installation is using an ICL 2804/60 with GOS 80s, MT and 7802 local and remote communications. Candidates should have experience of Exec 2 or George 2 operating systems and utility. The post is based at the headquarters of a manufacturing group in the electronics industry. The installation is sited on the South Wales coast. Shift working is not required. Apply urgently for early interviews. Telephone No. 021-454 7906. Diane Rosworth.

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IBM — Cobol Progs — IMS — Manchester — 6-12 months
IBM Analysts & Progs — Cobol — PL/1 — Sheffield — 6-12 months
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MIDLANDS

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Progs. — CMC — Reading — BASIC — Somerset — 6 months +
Honeywell L66 — ID52 — Cobol — Progs — Essex — 6-12 months
PL1 Progs. — IBM — OS — CICS — Kent — 6-12 months
IBM Systems Progs. — DOS/VSE — Assembler — Lincs — Essex — 3-6 months
IBM — Cobol — Progs. — DOS/VSE — Essex — 6 months +
OPO 11 — Cobol — Progs. — RSX 11/RS15 — London — 4 months
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ASSEMBLER PROGRAMMERS

Liverpool — c. £6,800

Our clients are a large and very successful merchandising organisation who have recently acquired their first IBM mainframe. At the present time they are developing prototype systems for the point of sale market and require experienced Assembler Programmers to help set up basic control systems. Salary opportunities are excellent. Attractive relocation facilities will be provided. Interviewing on-going project development experience is assured with this leading commercial group. Telephone No. 0782-623665. Colin Phillips.

TECHNICAL SUPPORT MANAGER

Surrey — c. £10,000 + Car

Our clients urgently require a top Technical Support Manager for hardware and software maintenance services to 50+ mini computer installations throughout the UK. He will be responsible for the management and budgetary control of a team of 4 highly skilled hardware and software specialists. Duties will include the following functions:
1. Problem solving both hardware and software faults at customer sites.
2. Liaison with manufacturers of the original equipment supplied with particular reference to technical support, quality control, warranty claims, training, new equipment appraisal and spares availability.
3. He will also be responsible for liaison with third party hardware maintenance companies and will monitor their performance on behalf of the clients.
4. Budgetary and financial controls.
5. Staff performance and motivation.
6. Liaison with sales departments regarding up-grades of existing equipment and the identification of prospective new installations.
Candidates must have a minimum 5 years' Data Processing experience with at least 3 years recently deployed within the micro processor sector. An additional 2 years' management experience with sound administrative and commercial managerial responsibility is required. The clients would prefer an electronic engineering qualification. They are seeking candidates aged between 30-40, able to work in a high pressure environment and have good customer communication ability. Telephone No. 0782-623665. Carol Attek.

SYSTEMS PROGRAMMING MANAGER

Berkshire — c. £8,800 + Car

Our clients, an industrial group, are seeking a new Systems Programming Manager who will report to the Group Systems Manager. Candidates should preferably have mini computer experience and a knowledge of IBM hardware would be particularly attractive. The company currently employs in excess of 2,000 staff within the group. There are 2 main locations and 4 sales locations with each unit having their own systems operations. This managerial appointment necessitates standing in for any of the managers during their absence and taking responsibility for assistance with any training required and any operations problem. The post will also involve the implementation of software packages, advising and recommending the feasibility of software packages throughout the group, and holding regular discussions with the General Manager about new systems requirements. Telephone No. 0782-623665. Carol Attek.

ANALYSTS AND PROGRAMMERS

Staffs — Up to £9,000

A major industrial group with a large Honeywell hardware investment are seeking a further number of experienced systems and programming staff who can make a positive and immediate contribution to project development. All staff should have acquired a minimum 2 years' previous Cobol programming experience. Ability to program in Fortran would be an additional advantage. A wide variety of commercial and industrial systems are currently being developed. These appointments offer an excellent opportunity for many years' involvement in on-going major systems and network project activities. Telephone No. 0782-623665. Carol Attek.

Mini Computer Software Development

W. London/Berkshire

To £11,000

We are recruiting on behalf of an established American company who produce high performance 32 BIT mini computer systems for the TRANSACTION PROCESSING MARKET. With many new exciting developments taking place at their Berkshire H.O., they have a requirement for an additional Designer/Programmer to work on an advanced database management system. The successful applicant will join a small professional project team which has total responsibility for

the development of the product. Ideally he or she should have 3-4 years D.P. experience in Assembler programming and systems design. This Company is highly recommended and offers a promising and rewarding future to those portraying dedication and enthusiasm. All the normal benefits associated with a company of this status can be expected. For further information please contact Eddie or Mike Howard or just complete the coupon.

Technical/Scientific

To £11,000



Car Allowance

Private Medical Scheme

PARAMIN was formed in 1974. To date they have offices in the USA, Europe and the UK, with several major projects to their credit in these countries, as well as Canada and Japan. PARAMIN UK are currently seeking experienced personnel to progress with the company into the 80s, working on extremely interesting projects. They require individuals from a scientific/technical background with a degree in Computer Science and at least two years' Coral Pascal Fortran or RT2 on minis or micro. You should be familiar with one or

more of the following areas: REAL TIME SYSTEMS, BASIC SOFTWARE, ROBOTICS, OPERATING SYSTEMS, A.T.E., PROCESS CONTROL and, in total, you should have a minimum of five years' experience in computing. PARAMIN has a very successful track record; this has been achieved through sound principles and standards. Develop your career with PARAMIN. For further information please contact Mike or Eddie Howard or just complete the coupon.

Consultants Systems Analysts

LONDON & H.C.

SALARY TO to £16,000

A highly respected Systems Consultancy based in Central London requires business minded Systems Analysts and Consultants to maintain and develop new business. You will be involved with many interesting aspects of this company's business, i.e. client proposals, presentation, on site development and overseeing work to final completion.

It is important that applicants are adaptable, articulate, neat in presentation and possess a high degree of technical competence. Mobility is also a requirement and opportunities for foreign travel are available. This is a highly reputable organisation implementing top level management for many years. For further information please contact Eddie or Mike Howard or just complete the coupon.

Cobol PL/1 Assembler

Edmund Howard & Partners have been established for some years, successfully recruiting all levels of personnel for a wide selection of Blue Chip Companies throughout the U.K. and Europe. Right now we have some key appointments requiring different levels of experience in user con-

sultancy and financial environments. If your experience covers any of the above languages we would be very pleased to hear from you, we won't waste your time. For further information please contact Eddie or Mike Howard or just complete the coupon.

Cosmos Systems Analyst

* Concessional Holidays * Latest Technology

* £ good neg.

COSMOS AIR HOLIDAYS has its HQ in Bromley, Kent. As a leading tour operator taking thousands of holiday makers to different parts of the globe each year, they will be very dependent on powerful computer backing. Currently they are preparing for a major upgrade this will be a large network of the very latest ICL ME29 computers utilising on-line and real-time transaction processing. They require an experienced Analyst

who has seen at least one project through to implementation possessing some knowledge of ICL hardware/software or travel applications. A Cobol background would be a bonus point. All in all this is a very good appointment offering the usual benefits associated with the holiday business. A good salary is offered, along with plenty of challenging projects, long and short term.

DEC IBM MODCOMP DG

UK & Holland

SYSTEMS TECHNOLOGY are a young, dynamic systems house dedicated to the design and development of complex computer systems. Based in Central London, with clients throughout the south of England and parts of Europe, they plan to open an office in Holland in the near future. They are currently undergoing a planned phase of growth and wish to attract young enthusiastic individuals with a degree or equivalent in a numerical discipline offering 1-3 years experience in any of the following areas:

- PROCESS CONTROL
 - BASIC SOFTWARE
 - REAL TIME SYSTEMS
 - SCIENTIFIC PROGRAMMING
- This is an excellent time to reem up with a highly successful company who are still young enough to recognise and appreciate dedication and determination. Career opportunities are excellent, offering variety and scope on projects in the U.K. and Europe. For further information please contact Eddie or Mike Howard or just complete the coupon.

UK & Overseas Systems Programmers Technical Authors

Here is an excellent opportunity for technically minded individuals with an interest in either systems programming or technical writing. A leading computer manufacturer is now recruiting additional personnel to meet the demands of a rapidly expanding section of the industry. PROGRAMMERS with a minimum of two years' technical experience will be involved in a variety of projects ranging from software design and development through to final testing and implementation prior to general release. TECHNICAL AUTHORS with some

previous experience in the production of technical specifications and software manuals will be required to work in close association with both software design and product test teams. Applicants should be prepared to tackle and solve all manner of problems and maintain a high standard of documentation at every stage. Rapid career advancement is envisaged for those with the right background, qualities and experience. For further information please contact Mike or Eddie Howard or just complete the coupon.

NAME	
ADDRESS	
TEL (Home)	TEL (Work)
POSITION APPLIED FOR	

Edmund Howard & Partners

5 Brighton Road, Surbiton, Surrey, England. Tel - 01 399 9183

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Phone: 0782-623665 (10 lines)

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COBOL + INITIATIVE

LONDON, WC1

c. £8,000

This position is not for the person who likes a structured and formal D.P. department but more for someone who is seeking to expand their own ideas under minimal supervision. The successful applicant will join a small team providing an in-house service to a group of professional personnel whilst also developing an intricate on-line system that will be marketed to a wide range of clients on a bureau basis. This very comprehensive package is being written in COBOL under TDS on Honeywell equipment and the person appointed will be given outline system specifications from which to develop and implement significant areas of the suite.

The Company also relies on real-time processing for internal applications and therefore the D.P. team is continually responding to user requests for amendments and enhancements. All programming is on-line, utilising the latest Honeywell technology which includes advanced editing features, video effects and graphics on 7800 VDUs.

A sound COBOL background is of prime importance but a knowledge of FORTRAN or RPG II will be an asset. Candidates will use their analysis skills to liaise with non-computer staff in order to understand and solve a variety of problems as they arise. Additionally, a good academic standard is required coupled with the personality and enthusiasm to operate effectively using his/her own initiative.

REF. S1/0210

SENIOR ANALYST FOR DATABASE ADMINISTRATION

THE CITY

circa £12,000

Our client is one of the largest of its kind in the U.K. whose operations encompass a wide range of financial and commercial operations including insurance, broking, merchant banking and international trade.

Due to a recent reorganisation of the Company, they are seeking a SENIOR ANALYST to strengthen the Database Administration Group. The job will undoubtedly prove challenging since it entails all aspects of database administration from consultancy at the feasibility stage; through detailed data/functional analysis and database design; to implementation and control of the corporate on-line databases.

We feel the necessary requirements are:

- * FIVE YEARS' D.P. EXPERIENCE
- * A SOLID PROGRAMMING AND SYSTEMS BACKGROUND
- * EXPOSURE TO IMS TECHNIQUES
- * DATABASE DESIGN EXPERIENCE

This is considered an important appointment since the Company is firmly committed to the development of on-line database systems utilising IBM products and in addition to an excellent salary the Company will provide training in this specialised field. Additional benefits are commensurate with other major organisations.

REF. S2/0210

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If you are interested in recruitment but do not have the necessary experience Myriad may be able to give you the opportunity to train as a Recruitment Consultant. If you have recruitment experience then Myriad could offer the opportunity for you to progress your career with one of the major companies in this field. With a well-established professional reputation, we have the scope resources and expertise to develop the skills needed to succeed in this challenging and rewarding work.

You must have a background in the computer industry, such as programming, analysis or any related sales oriented position. Without this essential grounding you could not be expected to give career advice to applicants or advise clients in major recruitment assignments. Under 30 you should possess the potential to succeed in highly sales oriented situations in which you will have the freedom to work very much on your own initiative.

The wide range of activities encompassed by the work will undoubtedly surprise you. You will also be interested in your training and career development. To find out the answers and much more about the varied and interesting life as a recruitment consultant, contact us to arrange an informal discussion and we will also tell you about the outstanding long-term career opportunities available.

REF. AW1/0210

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Our client is about to embark on an exciting expansion programme with the opening of direct retail centres marketing a complete range of electronic office equipment, including micro-computers and word processors, "off the shelf".

This represents an excellent opportunity for alert, technically minded professionals who wish to enter and develop their experience of technical marketing in a direct sales environment, backed by a first-class product range and support.

Ideally, applicants should possess an awareness of business systems and practices together with a broad knowledge of the mini/micro market. Experience of sales support would be a distinct asset.

With the increasing demands being placed upon technological advancement by both the private and business sectors, this is the first phase of our client's ambitious expansion plan, and consequently career prospects will be geared to personal ambition and achievement. A full range of company benefits including Pension Scheme and Life Assurance accompany this exciting opportunity.

REF. N1/0210

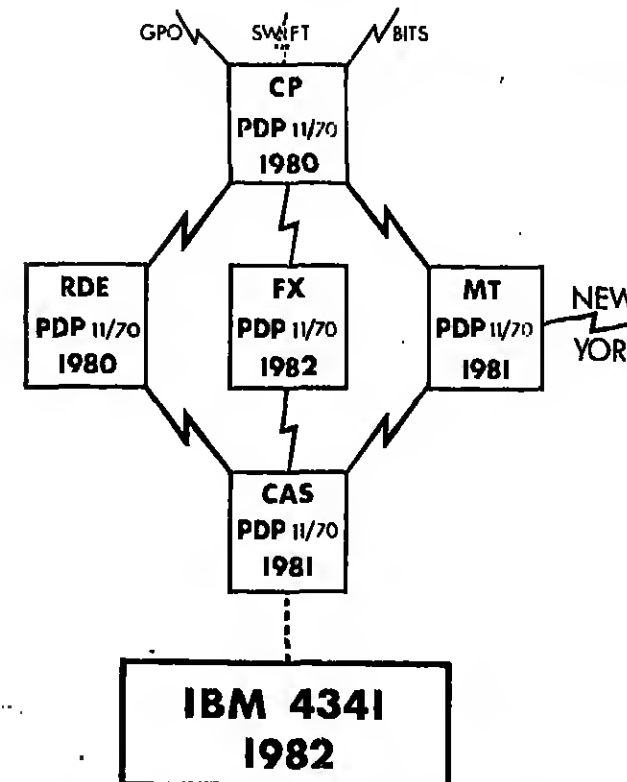
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It is essential that candidates have a thorough knowledge of REAL TIME INTERACTIVE SYSTEMS DESIGN. However, preference will be given to those who possess experience in a number of the following:

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- have plenty of variety, including hands on experimental work, real-time applications, system software, graphics, text and word processing.
- use your initiative and creative skills.
- play a significant part in a software development, as a leading member of the specialist group.

The opening will interest bright systems programmers with around five years' experience, including substantial Assembly on minis, micros or mainframes.

Our clients are an expanding, entrepreneurial electronics design/manufacturing company. You could be based either in a small, attractive East Hampshire town or at the London office near Waterloo.

Valuable fringe benefits include a Company profit-oriented bonus scheme, and assistance with property deposit and relocation costs, where applicable.

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(2968)



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COMPUTER MANAGER

Applications are invited for the new position in the recently established Computer Centre. The successful candidate will be responsible for the day-to-day management of computer facilities supporting the College's teaching and academic research activities.

The major facility is a 256 Kbytes DEC PDP 11/34 system running under RSTS/E using BASIC, FORTRAN IV. Additionally, a range of Cromemco, PET and RM380Z microcomputers are also provided.

The appointment will be made within the scale £8,836 to £7,077 (under review). Further details may be obtained from the Bursar, King Alfred's College, Winchester SO22 4WJ. Tel No. Winchester 62281.

Closing date for applications is 13th October, 1980.

(2004)

UNIVERSITY OF GLASGOW ADMINISTRATIVE DATA PROCESSING GROUP DATA PROCESSING CONTROLLER

Applications are invited from graduates or other suitably qualified persons for the post of DATA PROCESSING CONTROLLER responsible for the administration of student records for the University of Glasgow. Previous experience of working with computers would be an advantage, but is not essential. The appointment will be made on the career grade 16 scale for other graduates with the range £5000-£5700 (under review) with initial placement dependent upon age and experience. Further particulars may be obtained from the Secretary of the University Career Centre, University of Glasgow, Glasgow, G12 8QQ. With other applications to be sent, please send a recent photograph and curriculum vitae, should be typed on or before 15th October, 1980. In reply, please quote Ref. No. 4780. (2074)



IBM
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RPG11 COBOL Analyst / Programmers

MINI/MICRO
GENRAD 2270/2290 Programmers
BTI 4000/5000 Consultant
DEC RSX11M Software Programmer

ANALYSTS
Commercial Systems Analyst
with distributed processing experience

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Work in the Midlands, ring
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Minimum of 2 years' COBOL programming experience preferably on IBM hardware. Training offered for on-line applications.

PROGRAMMER
£6,000 to £5,500 NOTTS C494
Minimum of 2 years' COBOL programming experience on ICL 2900/1900 series. Maintenance and development distributive systems.

PROGRAMMER
£8/7k BEFORDSHIRE C465
COBOL or PL1 programming with some experience of CICS. IBM hardware.

PROGRAMMERS
£ Neg. LEICESTER C498
Experienced in COBOL programming on Mini and Micro hardware. Commercial applications. Bureau environment.

PROGRAMMER
£5k to £9.5k LINCOLNSHIRE C497
A minimum of 2 years' COBOL programming. Knowledge of IBM hardware, CICS and IOMS would be advantageous. Commercial environment.

PROGRAMMER/ANALYST
£ Neg. NORTHAMPTON C499
Minimum of 2 years' experience of RPG II programming with some analysis. IBM System 3. Manufacturing environment. Consultant: Roger Carr.

CUSTOMER SUPPORT
Up to £8,000 BRISTOL W298
Pre-sales support, installation and post-sales support for company's application package products. Minimum 2 years' experience using Basic or Basic+ on DEC PDPs.

ANALYST/PROGRAMMERS
Up to £8,000 BRIXTOL W297
At least 2 years' experience using Basic or Basic+2 on DEC PDP11s working on commercial systems.

ANALYST/PROGRAMMER
£ Neg. WARKS W285
Minimum 2 years' experience COBOL programming preferably on IBM equipment.

PROGRAMMER
£9,000+ HEREFORDSHIRE W284
2 years' experience Basic programming — to work on Data general equipment.

PROGRAMMER
£ Neg. WILTS W283
Minimum 3 years' Assembler on IBM equipment. Commercial applications, some on-line work.

CHIEF PROGRAMMER
Up to £9,500 WARKS W299
Candidates should have a thorough knowledge of IBM COBOL preferably with experience of CICS and DL1. Relocation offered. Consultant: Hazel Foggin.

ANALYST/PROGRAMMER
£5,500 WOLVERHAMPTON B949
Opportunity for young Graduate with some programming (preferably COBOL and RPGII) to join a progressive company providing excellent benefits and working conditions.

SNR. ANALYST/PROGRAMMER
To £9,000 WEST BROMWICH B993
Competent COBOL programmer with sound analysis experience required.

SYSTEMS ANALYSTS
To £9,000 NTH. BIRMINGHAM B954
Experienced analysts required to develop the existing range of interactive packages. Confident and able to express themselves.

PROGRAMMERS
To £9,500 NTH. BIRMINGHAM B995
Experienced COBOL programmer required. Interactive experience advantageous, to work on new Tandem 18 computer.

PROGRAMMERS
£6,500 WOLVERHAMPTON B959
COBOL programmers are required preferably with IBM background for development work on mini and mainframe hardware.

SENIOR SYSTEMS ANALYST
£8,000 WALSALL B997
Experienced systems analyst with strong commercial and financial background required for computer services centre of successful manufacturing organisation. Consultant: Peter Bowen.

PROGRAMMERS
£5,000 CITY CENTRE 5/863
1 year plus COBOL experience. Univariate hardware. Bureau environment. Commercial applications.

PROGRAMMERS
£ Neg. BIRMINGHAM 6/859
Programmers to work on Datapoint minis using Database preferably or any other interactive language.

PROGRAMMERS
£5,200+ BIRMINGHAM 5/957
Experience of ICL COBOL is required. Financial/Commercial applications. Insurance Company. Excellent fringe benefits.

PROGRAMMERS
To £7,000 BIRMINGHAM 5/659
2 years' COBOL preferably mainframe. Commercial and financial applications. New hardware recently installed.

PROGRAMMER
To £9,500 BIRMINGHAM 5/993
1 year + experience Basic +2 for commercial Bureau. City Centre offices.

PROGRAMMERS
To £5,500 BIRMINGHAM 5/694
At least 3 years' COBOL experience for latest IBM hardware. On-line Real-time applications. Consultant: Christina Pountney.

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(2899)

PROGRAMMERS

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Programmer

"If six years with IDEC my career has progressed well. There are a lot of very experienced people here, it's all very informal and working with them means you can learn a great deal. IDEC has pioneered a lot of new techniques to support highly complex systems. The technical side at IDEC is, for me, the most challenging."

MELVYN STANDEN —
Systems Consultant

"I wanted to join a company which would both employ and teach me. At IDEC I've definitely found it. There's plenty of interaction between disciplines, extensive training courses and a surprising amount of contact with hardware. I've got plenty of career options and my future is wide open. In the year I've been here I've progressed by leaps and bounds!"

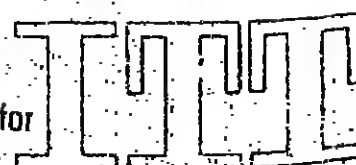
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Frank, Melvyn and Andy. Three software professionals with completely different backgrounds and ambitions. But each with one thing in common. A varied, rewarding and progressive career with IDEC. As a development centre for ITT Business Systems, IDEC is an established innovator in advanced microprocessor-based communications systems.

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A Development Centre for
ITT Business Systems



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PRODUCT SUPPORT SPECIALIST £9,500 p.a. + Car

The Product Support group provides the highest level of technical support to customer service organisations throughout Europe. Their responsibilities include the introduction of new products to the field, covering the implementation of maintenance philosophies and the recommendation of and participation in training programmes. In addition, as hardware specialists, they will provide support in the solution of complex problems and suitable candidates will have detailed experience of resolving technical hardware problems, particularly on sophisticated real time systems. Limited travel to Europe and the U.S.A. will be required.

Company benefits are excellent and include a non-contributory pension scheme, free life assurance and free BUPA.

For further details or an application form ring Sue Hampson on Wokingham 788711 or write to MODCOMP, Molly Millers Lane, Wokingham, Berkshire.

(2893)

MODCOMP

UNIVERSITY OF EAST ANGLIA

Norwich

LECTURER IN COMPUTING STUDIES

Applications are invited for the above newly established post in the School of Computing Studies and Accounting. Preference will be given to candidates having appropriate experience and research interests in the broad area of data processing, systems analysis and information systems. However, applicants with interests in any area of non-numerical computing will be considered. The appointment will commence on 1st January, 1981. The initial salary will be an appropriate point on the higher scale, currently £15,050 to £17,678 (interim review) plus £1,555 bonus.

Applications (one copy only) giving full particulars of age, qualifications and experience, together with the names and addresses of three persons to whom reference may be made, should be lodged with the Establishment Officer, University of East Anglia, Norwich NR2 1TJ (telephone 01603 58111 Ext 2128) from whom further particulars may be obtained, not later than 15th October 1980. The terms of application will be considered, in naming three referees we are particularly requested to give only the names of those who can immediately be approached.

(2897)

THE UNIVERSITY OF MANCHESTER

ADMINISTRATIVE COMPUTER UNIT ASSISTANT COMPUTER OPERATIONS MANAGER

SALARY £6,798 to £8,085

Candidates for the above post should have at least two years' experience at supervisory level and possess an in-depth working knowledge of Geac 2. Ideally the applicant should also be experienced in the operation of real-time systems within a commercial environment. The vacancy requires a person capable of mature leadership who is able to display drive and enthusiasm and provide a service to users and systems staff alike. Occasional shift working will be required. If the challenge of such a position appeals to you ring now for further information on 061-273 3333 Ext 3067.

Written applications should give full career details and be addressed to the Operations Manager, Administrative Computer Unit, The University, Oxford Road, Manchester M13 9PL.

(2898)

UNIVERSITY OF BIRMINGHAM

COMPUTER CENTRE

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Applications invited for this post (tenable until 31 October, 1983) to work on British Library funded project on development of an Electronic Journal. Candidates should have good honours degree and preferably a relevant higher degree as well as considerable experience of systems and applications software development. An interest in problems of man/machine communication an advantage. Salary on the Research Fellow (A scale £5,058-£9,984 plus superannuation). Minimum starting salary will be £7,355. Informal enquiries to Professor P. J. Jett (021) 472 1301 Ext. 2223. Further particulars from Assistant Registrar (Ext. 2-Eng), P.O. Box 393, Birmingham B15 2TT, to whom applications (three copies), including full curriculum vitae and naming three referees, should be sent by Tuesday, 21st October, 1980. Please quote reference CW24(S), plus.

UNIVERSITY OF LIVERPOOL

Computer Laboratory

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A C.A.S.E. Studentship is available in conjunction with GEC (Europe) Ltd. research into the possible use of microprocessor systems in the monitoring and control of medium voltage substations.

This project will be of particular interest to applicants with first or upper class degrees in Electronic Engineering or Computer Science.

Applications, together with the names of two referees, should be received as soon as possible by The Registrar, The University, P.O. Box 147, Liverpool L69 3BX from whom further particulars may be obtained. Quota for EU/EEC/OW.

(2894)

CAD S/W ENG

Software Engineers and Designers with experience of technical and CAD Software on DEC, Prime or similar equipment required for development work on CAD projects with this East Anglian client. Knowledge of Fortran and Assembler preferred.

£6.5K

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2+ years' Fortran on Honeywell Level 68 equipment (preferably under GCOS) urgently needed by London-based Systems House for important, long-term project in Holland. Relocation offered. Initial interview in London.

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A Consultant is required to join Matrix's small informal office near Gloucester Road. Suitable applicants will be graduates in their mid-twenties with some experience of the computer industry (detailed Systems knowledge is not required).

The success of the company relies on maintaining excellent relations with its clients and candidates, therefore good communication skills and a friendly, outgoing personality are of considerable importance. A retentive memory, the ability to grasp new ideas quickly, and to work effectively without supervision are also necessary.

If you feel that you have the appropriate qualities, and are LOOKING for a new challenge, please call our office, or send a detailed CV. Interviews will be held at our offices during early October.

DB/DC UK & EEC

Programming background in COBOL, PL1 or BAL on minis or mainframes and knowledge of DB/DC systems required for positions at all levels in the UK, Belgium, Holland and Germany. Foreign languages an advantage. to £17K.

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SYSTEMS ENGINEER

2+ years' in logic design, prof. in micro plus science/engineering degree for work in areas of logic and byte micro, also interfacing terminals and communications with Herts-based company. Intellect important, plus mobility for variable length overseas assignments. to £8.5K.

SYSTEMS PROGRAMMER

1-2 years' Systems Software in Assembler on Minis plus CORAL for design, development and providing technical support to Dutch client of Herts-based Mini. Important, plus mobility for variable length overseas assignments. Travel to Holland required.



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(2896)

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(1004)

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You will sign a contract for a minimum of two years and client will be responsible for return airfare for applicant and family.

Apply in first instance to Mr. Colin Roberts, Tel. STD 04383 4551 or write to 1, Smith House, George Street, Netherworth, Stroud, Glos. GL80AG.

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For any of the above positions please contact PAM JONES or LARRY PIENAAR on 01027 11 218181 or COLIN ROBERTS on STD 04383 4551 or write to P.D. Box 4635, Johannesburg, Transvaal, Republic of South Africa.

(1005)

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Please write or telephone:
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(1007)

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(1009)

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(1010)

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At least four years' commercial programming experience is essential. Knowledge of 2900 and VME/8 desirable, and experience of micro of mini computer systems would be a bonus. Appropriate training will be given, if necessary.

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(1012)

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Two vacancies for DOS PL1 personnel with a minimum 3 years' experience.

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Initial 3 months' contract working on on-line Order Processing and Stock Control Systems.

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0191

UNIVERSITY OF ESSEX Data Processing Section

SYSTEMS PROGRAMMER

Applications are invited for the post of Systems Programmer in the Administrative Data Processing Section. The successful candidate will join a team of four people responsible for providing applications software for a DEC SYSTEM-10 and on a number of MICROPROCESSOR systems. Candidates should have a sound knowledge of programming in COBOL and be interested in developing applications software in PASCAL on MICRO-PROCESSOR systems. An understanding of data legal and micro-electronics of operating system software would be useful. Salary in the range £3500-£11875 (scale related). Applications (three copies), including a curriculum vitae and the names and addresses of two referees, should reach the Registrar (AG/110/CW), University of Essex, Wivenhoe Park, Colchester CO4 3SQ, from whom further particulars may be obtained by 21st October, 1980.

BOX Nos.

Box number reply should be addressed to:
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Oxford House
London EC1A 1EL

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who will be responsible to the Computer Manager for the staff, including 12 Data Preparation staff, to set up and work to a schedule of computer processing from receipt of data to production of results, and to be responsible for the check/through-out of all results prior to the release of output and the control of all file maintenance.

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Vacancies also exist for development staff. You should offer a minimum of eighteen months' working in a commercial environment. While not an essential requirement, our client is particularly interested if you offer experience in Assembler on ICL System 10 hardware.

Male or female candidates should contact Patrick Conway, quoting reference number CW 285.

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You need at least a year's mini or micro experience, hardware and/or software — and knowledge of DEC and/or PDP11 with RSX11 is especially welcome. Languages: Assembler, Coral or Fortran.

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A thorough understanding of business problems, an outgoing personality and an eye for detail are essential qualities. Your background will include 3 years commercial system design and analysis, preferably in a turnkey or software house environment and in depth knowledge of COBOL or BASIC.

Support Programmers

£8,000 + Car + bonus

Our Clients programming teams also need strengthening in both locations. A minimum of 18 months COBOL or BASIC on a mainframe or mini, on applications such as accounts, payroll and sales are the essential qualities sought. You will be on-site the majority of the time through some in house package development may be involved. An excellent bonus scheme operates for both positions plus an attractive range of fringe benefits.

Contact: Brian Poston

Senior Systems Analysts

Central London To £11,500

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These openings are London based but there will be opportunities to travel internationally.

Contact: Jim Baker

Senior Programmer

Middx. £10,000

This multi-national industrial organisation need an experienced person for one of their specialist divisions who are currently developing various commercial systems on mini and micro computers, also on IBM 3033, with plans to use an IBM 8100 mini-computer and colour graphic screens/printers.

Applications range from order processing to on-line personnel management information. It is essential to be an accomplished COBOL programmer from an IBM environment, with exposure to CICS and IMS.

Experience in the development or enhancement of one major system and the ability to control staff, would be a definite advantage. The company can offer good career prospects, an excellent salary and fringe benefits.

Contact: Janet Chivers

Sales Support

Central London to £10,000

This internationally recognised hardware manufacturer, is looking for experienced Analysts/Programmers from a financial organisation, to join a team of highly professional people servicing the banking world.

A minimum of two years COBOL programming from a relevant environment, with exposure to users/clients problems and requirements is essential. Involvement in the enhancement or development of one major system would be a definite advantage. The Company offer interesting and varied career prospects coupled with a good salary package, and the usual fringe benefits associated with a large organisation.

Contact: Janet Chivers

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Hampshire up to £10,000

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A minimum of three years experience of working on real-time industrial or military systems is essential. Candidates should preferably have a degree in Computing or Electronic Engineering and ideally a knowledge of PDP11 with experience of MACRO11 and RSX11. Salary will be negotiable according to age and experience and the usual range of large company benefits including a generous relocation package will be offered. There will be some opportunities for international travel.

Contact: Isabel Bruce

Computer Manager

Central London to £9,000

Our client, a small publishing company in the West End wish to appoint a Computer Manager to lead a team of 3 running an ICL 2903 site. They are using a real time sales and distribution system which uses database type techniques.

The position would suit a Senior Analyst/Programmer who wishes to move into a more senior role. Candidates should have a knowledge of RPGII and possibly ICL's Application Manager but the latter is not essential.

Although development work at the moment is not active the successful candidate will have to co-ordinate the installation of a new machine which is planned for early 1982. Salary is negotiable according to relevant experience.

Contact: David Hendry

Programmers

City to £9,000 + free season ticket

Our client is a systems house and subsidiary of well established insurance brokers. As DEC OEM's they provide a comprehensive range of facilities which include purpose designed software for financial/insurance applications based on PDP11 under RT11. In line with constant growth they are now seeking programmers to be involved in the inception stage of some extremely innovative projects.

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Contact: Margaret Stevens

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data scene

COBOL PROGRAMMERS

HERTS c. £7,000

A European based company whose products are sold world wide seek COBOL Programmers for their ICL 2904 installation.

Candidates should be aged between 20 and 35 and have a minimum of 12 months programming experience, which may have been gained on any hardware.

The applications cover most standard financial work encompassing both development and maintenance.

In return the company offers a good salary, B.U.P.A., non-contributory pension and life assurance. D.4694

BASIC + /BASIC + 2 PROGRAMMERS

CITY £7500

We are in contact with three banks in the city who are seeking programmers with upwards of eighteen months experience in BASIC + BASIC + 2, or AIMS. Successful applicants can expect to be working in a batch and real-time environment on applications such as foreign exchange and Eurobonds. Opportunities for career progression are excellent and the employment packages offered are without equal. R/GEN

SALES SUPPORT CONSULTANT

N. LONDON to £8,500 + car

Our client is a well known service company associated with the construction industry who seek a sales support consultant.

The successful applicant will be well spoken, of good appearance and have at least three years' in depth IBM experience of either programming or systems analysis. The position is technical and office based but with a strong emphasis on client liaison.

They offer a salary of up to £8,500, a company car and 5 weeks annual leave. D.4595

ANALYST/PROGRAMMERS

ESSEX to £8500

If you are strong in Systems Analysis and would enjoy working in a real-time or on-line environment in addition to batch applications there are vacancies with two of our clients in the Essex area. A programming background in COBOL and a knowledge of UNIVAC 9030 or HONEYWELL 684 would be appropriate. Both companies offer a comprehensive range of benefits. R/4674/5

RPG II or COBOL PROGRAMMERS

E. LONDON C. £6900

A member of the stock exchange requires programmers for their IBM 4341 installation.

The company use both RPG (for batch processing) and COBOL and candidates will ideally, have a knowledge of both.

A minimum of 18 months experience as required. Experience of C.I.C.S. would be advantageous though not necessary. The applications are financial. The salary totalling £6900 is supplemented by luncheon vouchers and company loans. D.4688

ANALYST/PROGRAMMER

SW LONDON £8500

A well known toy company are expanding their Data Processing Department and require an experienced Analyst/Programmer to complement their existing team. DEC hardware is used and a background of COBOL or BASIC would be particularly appropriate. Successful applicants, who should ideally have 3-4 years' experience, can expect to work on a variety of applications and utilise their skills to the full. Generous company benefits are offered. R.4613

ANALYSTS/PROGRAMMERS

S. HAMPSHIRE to £8500

A leading supplier of electrical appliances require both programmers and analyst programmers for their IBM 3031 installation.

Applicants should have at least 18 months experience of either commercial or scientific applications, using COBOL. Analysts should additionally have completed at least one project to implementation. A knowledge of C.I.C.S. and OLI would be a bonus.

As well as a good salary the company offers a subsidised restaurant and staff shop. D.4640

COBOL PROGRAMMERS

MIDDX. £6-£8000

Several clients in the Middles, area seek COBOL Programmers. A wide range of application areas is involved using either HONEYWELL or UNIVAC equipment. We would like to hear from programmers with upwards of eighteen months experience especially those with Data Base or On-Line experience to discuss opportunities within the foods, aircraft and other industries. R.4625

The above vacancies are only a small selection from those currently on our files and we are always delighted to talk to experienced systems and programming staff wishing to further their careers. (2089)

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ASSISTANT

to undertake statistical consulting and computer work in relation to the wide range of research projects undertaken by the department within the University and in support of the research work of academic staff. Applicants should have a good background in statistics and computing and a relevant degree (or equivalent). It is desirable that applicants should have a good knowledge of the use of a computer and a good knowledge of the use of a statistical package. The salary will be in the range £4795 (£5616 a year on Grade 11) or £5195 (£6196 a year on Grade 12) or £5595 (£6596 a year on Grade 13) or £5995 (£6996 a year on Grade 14) or £6395 (£7396 a year on Grade 15) or £6795 (£7796 a year on Grade 16) or £7195 (£8196 a year on Grade 17) or £7595 (£8596 a year on Grade 18) or £7995 (£8996 a year on Grade 19) or £8395 (£9396 a year on Grade 20) or £8795 (£9796 a year on Grade 21) or £9195 (£10196 a year on Grade 22) or £9595 (£10596 a year on Grade 23) or £9995 (£10996 a year on Grade 24) or £10395 (£11396 a year on Grade 25) or £10795 (£11796 a year on Grade 26) or £11195 (£12196 a year on Grade 27) or £11595 (£12596 a year on Grade 28) or £11995 (£12996 a year on Grade 29) or £12395 (£13396 a year on Grade 30) or £12795 (£13796 a year on Grade 31) or £13195 (£14196 a year on Grade 32) or £13595 (£14596 a year on Grade 33) or £13995 (£14996 a year on Grade 34) or £14395 (£15396 a year on Grade 35) or £14795 (£15796 a year on Grade 36) or 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COMPUTER WEEKLY

OCTOBER 30, 1980

RECRUITMENT & EDUCATION SUPPLEMENT

the most informative publication of its kind in the UK

In spite of rising unemployment the computer industry continues in its demand for a regular supply of qualified computer people. As the market expands, so does the need for new skills and abilities. Although more and more training facilities are available, the chronic shortage of manpower remains, causing a major problem for all companies involved with computers.

Our annual Computer Weekly recruitment and education supplement, especially planned to coincide with and be available at Compec '80 — Britain's biggest computer exhibition — will be packed full of valuable information covering the whole spectrum of the computer job market. Editorial contribution will be substantial, appealing to data processing professionals, as well as the next generation of young people who will be required to take up the

challenge and share in the achievements of the next decade and beyond.

This year's supplement will be published on October 30 and distributed in the normal way to all Computer Weekly readers. Copies will also be available to visitors from the Computer Weekly stand at Compec. Last year, some 34,745 visitors attended the exhibition.

The supplement is a unique publication, being the only newspaper of its kind produced in the U.K. dealing specifically with the subject of careers and job opportunities for DP personnel. The combination of the supplement's extensive editorial support, the large circulation, and Computer Weekly's standing in the industry, means this supplement is a must for recruitment advertisers.

Computer Weekly has the largest circulation in the specialist computer press (91,656 ABC July-Dec 1979). This has increased continually over the years to reflect the ever growing number of personnel in the computer industry. Additionally, and equally important, the newspaper has the highest number of individually requested copies of any weekly computer publication.

For further details regarding the supplement and the special Compec *free* computerised recruitment service, contact your nearest Computer Weekly Classified Office: London: 01-261 8028/8019/8174/8097. Manchester: 061-872 8861. Birmingham: 021-356 4838.

COMPUTER WEEKLY

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THE SALES BIT

Redundancy — your rights as an employee

TO MOST employees the Employment Protection Act is a piece of industrial legislation that only becomes known to them when they suddenly realise they no longer have a job. To many it is a total oblivion that follows them to the dust queue.

My interest primarily rests with salesmen and technical support people, but the topics I shall be covering in this series of articles on employment protection embrace anyone with the job title "employee".

The loss of employment usually occurs as a result of redundancy, dismissal or death. Let us first of all investigate the former.

Onus

Redundancy is generally defined by the Act as a dismissal attributable wholly or mainly to the fact that the employer has ceased or intends to cease the operation of the business within which the employee was employed, or has ceased or intends to cease the operation of that business in the location where the employee was so employed.

A state of redundancy may also be declared when the employee is no longer required to carry out a particular kind of work, or to carry out such work in a particular place. Redundancy therefore typically occurs when a company relocates or suffers a setback in business necessitating a reduction in the workforce.

However, in circumstances where the justification for redundancy is based on reducing the workforce for a particular kind of work, the onus is on the employer to make it clear that the nature of the work or workload has changed, rather than the standard the employer expects the employee to meet.

In cases where the working hours are re-arranged, say, in order to reduce costs by cutting down the amount of overtime worked, employees who refuse to accept such an arrangement cannot be classified as redundant so long as the total number of employees of that kind is not reduced as a direct consequence.

Alternatives

Often the cessation or reduction of requirements for people of a particular job function can result in an offer of alternative work or different terms of employment. In this case, the employee is entitled to a four-week trial period. If this involves re-training, then the trial period can be extended by written agreement between the parties. This must specify the date on which the trial period ends and the terms and conditions that will subsequently apply.

If during this trial period the employer or employee give notice to terminate the arrangement, then the employee will be treated as having been dismissed for the reason originally stated, ie normal redundancy.

Any employee who refuses an offer of alternative employment or resigns during any

such a trial period will not be entitled to any redundancy payment, if his or her refusal or resignation is shown to be unreasonable. However, in the circumstances of an industrial tribunal it is the responsibility of the employer to establish the fact that the alternative work was suitable and the employee's rejection unreasonable.

Change

The change of ownership of a company usually creates a degree of insecurity among employees and sometimes the possibility of redundancy is contemplated as a consequence. Certainly an employee is not entitled to any kind of redundancy payment as a direct result of change of ownership. However, in the event of a redundancy situation at a later date, the whole of the employee's service, including that with the previous owner, must be taken into account when calculating redundancy payment. This is the total responsibility of the new owner.

Employees will not be entitled to redundancy payment if they unreasonably refuse an offer by the new owner to re-engage them on the same terms as before, without any break in employment. This also applies when the employer offers to re-engage them on different terms, provided the offer is made prior to the change in ownership, the offer is suited to the employee and any break in employment does not exceed four weeks.

Next week I shall be discussing possible events during the period of redundancy notice and the actual calculation of redundancy payment.

TRADER

CONFERENCES

Computer aided drafting

A CONFERENCE to be held in London on November 17 will assess geometric modelling and computer aided drafting. Organised by Oyez International Business Communications, the conference is aimed at those concerned with structural design. The conference will examine the use of a 3D geometric model in a turnkey CAD/CAM system. A slide presentation of a turnkey system embodying these principles will also be given. For further information, telephone Mallory Barker on 01-242 2481.

Two conferences are to be held in conjunction with the Video Trade Exhibition. Organised by Normedia and Link House Publications, the conference will be held at the Wembley Conference Centre. On November 18, the conference theme is Information Storage and Retrieval (ISR) and on November 19, Video Assisted Instruction (VAI) will be the subject. For further information, telephone Suzanne Sims of Normedia on 01-629 9381.

A three-day Infotech Briefing is to be held at the Kensington Close Hotel London from November 25-27. The briefing aims to provide potential purchasers and industry consultants with impartial advice on evaluation and selection of a small business computer. The event will include analysis of micro-based systems costing up to £12,000 and a review of specialist small business computer suppliers and general purpose suppliers of systems up to £70,000. For further information contact Tony Barber on

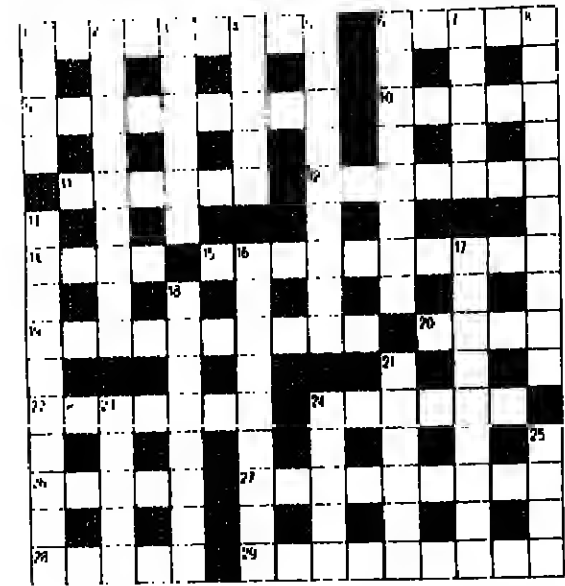
Puzzle Answer

THE only possible answer is $2^2 + 11^2 = 5^2$. (If the integers need not be different, $2^2 + 2^2$

CW Prize Crossword 9

Compiled by Alec Robins

A prize of £10 will be awarded for the first correct entry opened. The second and third solutions opened will receive £5 each. Entries to Crossword Competition, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU, by first post Friday, October 10. Please use a ballpoint to complete the crossword.



Name: (Miss, Mrs, Ms, Mr)

Address:

Telephone:

I accept the rules and conditions of the Computer Weekly Crossword Competition.

Signed: Date:

ACROSS

- Sound of cold winds in southern hills (9)
- It's a bird - shoot it (5)
- Illogical having quips with servant (9)
- Some of you trivialise, being backward, a hive of fine arts (5)
- Courtesy is the order in a large town (6)
- Scholar left after everyone else, providing a scathing fulmination (7)
15. Reassembling, in a hole, with diplomacy, in a calm indifference (4,3,3)
20. With death imminent, makes amends with various past gals (2,4,4,4)
- Legislation that brings about a reverse for a member of the UK (4-3)
- This chap's beginning to twist the wanderer's return (6)
- Act boastfully, playing against a relative (5)
17. In delay a definite commitment, tries poem out (9)
28. Bored work absorbed by revolutionary... (5)
29. ... who after throttling ambassador, is sent down (9)

DOWN

- A pile of hay for the bird (4)
- Lover thanks Italian one turning up with a ring (9)
- Admit cheat (4,2)
- This game's odd - dear me! (5)
- Children straddling big winding road for larks, perhaps (9)
- What you're out of when you're in, and in when you're out? (8)
- Warm garment in which Dad protects chest (5)
- Behaving in character, a mixture of petty and out (4,2,4)
- The interval about finished, shoot out from concealment (5,5)
- What good arguments and buckets do? (4,5)
- One who dissects something very small - it's twitching (9)
- Punctured? What such a tyre is, in actual fact (8)
- Take care to become a member (6)
- Serious fall in business depressed area quickly (5)
- Eastern language; the reverse of dull, attracting the Italian (5)
- Nurse, it's a finish (4)

RULES AND CONDITIONS

- Each competitor may submit no more than one entry.
- The competition is open to all readers of Computer Weekly, with the exception of the staff of IPC Business Press Ltd, any printers employed by them, or the near relatives of any such staff.
- The solution of each puzzle will normally be published in the issue three weeks after the puzzle has been published.
- Winners will receive their prizes during the month following the competition.
- The decision of the editor on the interpretation of the rules and conditions and on all matters shall be final. No correspondence will be entered into.

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Analyst-Programmers

Saudi Arabia c. £11,000 tax free

Required for the Telephone Extension Project, which is operated and maintained by Bell Canada. Applicants must have at least 1 year's programming experience using COBOL, have JCL experience using MVS JFS 2 and knowledge of IBM 360. Will be required to code and test complex programs, assist in the development of systems feasibility, design programming and maintenance.

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Telephone for an application form, quoting ref. no. 66, to Gordon Smith, Lonsdale Recruitment Limited, International Recruitment Consultants, Lonsdale House, 36 Great South St., London SW1P 3BU. Tel: 01-222 1677.

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Thames Valley Police are looking for an experienced Senior Programmer to perform development and maintenance work on a computer on-line system. A challenging series of extensions to this system and to associated I/O batch programmes is envisaged.

The successful applicant will have extensive COBOL experience on an on-line system, preferably but not exclusively with Honeywell 6000/level 68 using IDS and TOS. He/She must be willing to take an increasing interest in the maintenance of existing software, and development of future systems, and be capable of working to rigid standards. He/She will also have the ability to communicate at all levels.

Over 5 weeks' holiday, pension scheme, assistance towards removal expenses.

Application form and further particulars from:

The Principal Personnel Officer
Thames Valley Police Headquarters
Middletown, Oxfordshire OX4 2HX
(Telephone Kidlington 4343, ext. 287)

London Borough of Hounslow
Hounslow Borough College

SENIOR LECTURER

required to take charge of computing and data processing. The successful applicant should be able to teach programming in BASIC and COBOL and computer operations and to supervise work experience programmes.

Salary: £8,982-£11,295 plus L.W. £408

Further particulars and application form from the Principal, Hounslow Borough College, London Road, Isleworth TW7 4HS, on receipt of a S.A.E. Closing date 14 days from the appearance of the advertisement.

Recruitment **LOGISTIX** in Informatics

Financial Designers

City: Salary to £12K

A major Financial Institution based in the City is seeking to recruit additional Financial Designers. Candidates must be self-motivated, personally presentable and have the ability to liaise with Users and Consultants at all levels. It is essential to have at least three years' Banking or Insurance experience and to be familiar with Foreign Exchange, Eurobonds, Premium Receipts or Portfolio Management/Investment.

Candidates who have worked within a multi-computer based distributed processing environment will be particularly favoured. As a member of a small project team comprising Systems/Business Analysts and Programmers you will be involved in the development and implementation of new systems for both the City Offices and its European counterparts. Ref: L/40/A

Real-Time Applications

Pennine Counties: Salary to £10K

A foremost Total Systems Supplier has an urgent requirement for Analyst/Programmers and Project Leaders to join either its Customer Support or Software Development teams. Analyst/Programmers should possess at least 2 years' Basic or Assembler programming experience gained on any leading mini or micro-computer. Additionally, successful

candidates will be expected to offer at least 12 months analysis of either technical or commercial systems. Project Leaders should have a similar background supplemented by actual or potential management abilities. Location is unlikely to be a limiting factor as the company is well served by road and rail facilities. Ref: L/40/B

Microprocessor Engineers

Switzerland: Salaries to £15K (equivalent)

Our client has a justifiably enviable reputation as a Semi-conductor Equipment Supplier. Its manufacturing and software development Headquarters is situated near Zurich. We have an exclusive assignment to recruit several Software Development Engineers to join the Company's permanent staff. Emphasis will be placed on technical achievement and in-depth industrial/practical experience. A Bachelor or Masters Degree in Electronics, Electrical Engineering or Computer Sciences is a desirable asset. Additionally, all candidates must offer a minimum of four years' microprocessor, software development. There is a preference for those fully familiar with Motorola 6800 hardware and software, although, of course, respondents will be considered who have had in-depth ex-

perience with Intel 8085/88, Zilog Z80/Z800 or Fairchild Systems Software. It is preferable to offer some German language ability for social-cultural reasons, as much as for the working environment. Of prime importance is a real enthusiasm to relocate to Switzerland for a minimum period of 2 years. Every assistance will be given in relocation including the cost of removal of all personal effects and such time as you are settled in a permanent apartment. The client offers an above average salary together with an unrivalled range of ancillary fringe benefits. Initial screening interviews will take place in London after which short listed candidates will spend one day at the Company's premises. Ref: L/40/C

Micro Support

Central London: Salaries to £8K + Car

Our client is a leading Micro-Computer Manufacturer based in Central London. The rapid increase in sales of its Business Systems has created vacancies for additional Micro Service Engineers and Software Support Programmers to maintain and enhance its reputation for outstanding post-sales hardware and software support. As a Micro Service Engineer you will support the increasing customer base of microcomputer systems and terminal products. Full training will be given to young, ambitious engineers with an in-depth

knowledge of Electronic Engineering and Microprocessor technology. Software Support Programmers should offer at least one year's BASIC or PASCAL programming experience on any mini or preferably microcomputer. In addition to a sound Software programming background, interest in Personal Computing will be a distinct advantage. For all positions, candidates must demonstrate the ability to liaise with customers and solve any problems which may arise both quickly and professionally. Ref: L/40/D

H. P. Scientific Programmers

Netherlands: Salary to £16K

Fluency in FORTRAN, gained from continuous exposure to scientific applications for a minimum of 3 years, is the prime requirement of our client. During this period, candidates will preferably have been exposed to Hewlett-Packard 21MX, 1000/3000 series hardware in an on-line environment. Since the company is one of

the leading Continental Total System Suppliers, suitable applicants will currently be employed by a similarly successful company. Applications areas include graphics, signal processing, flight control and analysis. Those working for military or process control in a non-total company will therefore be of particular interest. Ref: L/40/E

Process Control Programmers

Greater and Inner London: Salary to £10K

A leading supplier of Industrial Processing and Control Systems with London-based Headquarters and a Manchester regional office is seeking to recruit Programmers with one to five years' Programming and Systems experience. All applicants should offer at least one year's post-graduate programming experience in ASSEMBLER, PASCAL or BASIC, preferably in a real-time environment. Whilst it is not essential

for candidates to have a micro background, preference will be shown to those able to demonstrate involvement with Intel, Zilog, Motorola or Ferranti based systems. The possibility of secondment, if desired to the Company's German office for short or long-term assignments. Salaries offered will, naturally, reflect the experience and potential of applicants but will certainly be generous. Ref: L/40/F

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EXPERIENCE

3 years' 2108 or 2108-4000
Some systems design
Ideally a banking background
Preferred age 25-40

Candidates who wish to apply for this position should write or telephone for an application form (quoting reference MW21) to the address shown

OS/MVS OPERATIONS

N. KENT

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One client, a leading financial company will soon be upgrading their hardware and will be running under OS/MVS. To users with this conviction they wish to recruit an experienced operator/programmer. Applicants should have a good knowledge of OS/JCL and be fully conversant with OS/MVS. The selected candidate will initially be involved with the training of operators staff. The DAYS ONLY position offers excellent working conditions and attractive financial benefits. Ref: 84354

COMPUTER OPERATOR SOUTH LONDON

c.£6,000

A well known company in the own field have asked us to assist with the recruitment of a computer operator. Applicants for this position should have gained a minimum of two years' TLI 2980 under VME/3. Applicants with DME experience will also be considered. This is an ideal opportunity for anyone who wishes to progress within operations. A good salary is on offer. Details include pension scheme, free meals. Ref: M4123

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Start £7,500 + Car + O/T + Benefits

A major American mini manufacturer is launching a field service organization from scratch to support its activities in London and Home Counties. This could be your opportunity to gain experience on a wide range of prestige minis and their applications, whilst enjoying the prospects only offered by a new venture like this. Start at £7,500 + car + overtime + benefits. If you are a service/customer engineer with good academic background, computer experience, live in one of the above locations, then take a big stride forward to an exciting career by calling today. Cons. Ref. 2238. (12920)

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